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Table of Contents.

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ORIGINAL ARTICLES—	Page.	ABSTRACTS FROM MEDICAL LITERATURE—	Page.
An Address, by Mr. Justice R. S. Bonney .. .	125	Therapeutics .. .	146
The Physiological Activation of Prothrombin, by P. Fantl and Margaret H. Nance .. .	128	Neurology and Psychiatry .. .	146
Recent Progress in Pædiatrics, by Felix Arden .. .	133	BRITISH MEDICAL ASSOCIATION NEWS—	
Risks of Surgery in the Aged, by J. W. S. Laidley .. .	136	Scientific .. .	148
Risks Associated with Anæsthesia of the Aged, by P. L. Jobson .. .	138	MEDICAL SOCIETIES—	
REVIEWS—		Melbourne Pædiatric Society .. .	150
"Clinical Psychology" .. .	140	CORRESPONDENCE—	
Diseases of the Chest .. .	141	Rupture of a Hydatid Cyst into the Vena Cava .. .	152
New Ways of Treating Uræmia .. .	141	POST-GRADUATE WORK—	
Dust and its Effects on the Respiratory System .. .	142	The Post-Graduate Committee in Medicine in the University of Sydney .. .	152
Penicillin Therapy .. .	142	OBITUARY—	
NOTES ON BOOKS, CURRENT JOURNALS AND NEW APPLIANCES—		Julian Augustus Romaine Smith .. .	152
A New Abstracting Service .. .	142	AUSTRALIAN MEDICAL BOARD PROCEEDINGS—	
LEADING ARTICLES—		Tasmania .. .	155
Specialism and its Safeguards .. .	143	NOMINATIONS AND ELECTIONS .. .	156
CURRENT COMMENT—		MEDICAL APPOINTMENTS .. .	156
Cigarette Smoking and the Heart .. .	144	BOOKS RECEIVED .. .	156
"Agenized" Flour .. .	144	DIARY FOR THE MONTH .. .	156
The Local Application of Sulphonamides .. .	145	MEDICAL APPOINTMENTS: IMPORTANT NOTICE .. .	156
BAL and Lead Poisoning .. .	145	EDITORIAL NOTICES .. .	156

An Address.¹

By MR. JUSTICE R. S. BONNEY,
*President of the Medico-Legal Society of
New South Wales.*

FIRST of all, ladies and gentlemen, let me thank you, with excusable pride, for the honour which you have conferred upon me in asking me to preside at this inaugural meeting. I assure you that I appreciate it very much. It is indeed a privilege to be present and in the chair at the foundation meeting of a new society, which has for its purpose collaboration between the two great professions of medicine and law.

A society such as this is long overdue in New South Wales. Each profession can improve itself and render better service by entering into this friendly intellectual relationship with the other and by an exchange of ideas in matters of common interest and concern. For one thing, we might clarify and crystallize our ideas upon certain public questions in which our two professions might well be expected to take part and offer a guiding hand.

I have in mind such problems as the obligations of society towards its mentally deficient members, and the problem of the proper understanding and treatment—legally, medically and psychologically—of crime. There are many others.

I used, advisably, the expression "offer a guiding hand", because the ultimate decision on most matters of importance rests with the lay public, who are ill-equipped with the necessary technical knowledge to form an instructed conclusion.

Ignorance—and by ignorance I mean ignorance of the true and full facts which should form the basis of a

person's judgement—is one of the most dangerous and insidious enemies of civilization. A few years ago the world had the pathetic example of the influence of mass ignorance, when one of the States of America passed an act of parliament to prohibit the teaching of the principles of evolution.

You may smile and say that anything can happen in America. But ignorance can dominate the actions of man anywhere on earth, just as it did when Galileo and his compatriots were debarred from stating or believing that the earth was round and not flat. Anyone who knows something of atomic physics can see the terrible danger of a modern repetition of the censorship of knowledge. The uninstructed public, and their political leaders, become terrified by any great advance in knowledge which they do not themselves understand. They therefore seek refuge in an attempt to find security in the suppression and censorship of the knowledge which they fear.

It is my firm belief that we have reached a stage of civilization at which every man must be encouraged to assimilate knowledge of the things in which the world is advancing by leaps and bounds either to its destruction or—if discovery is properly understood and used—to its most glorious era.

At this point, let me return to my theme, the obligations of our own professions in a world such as this. Both professions, medicine perhaps more than law, have been inclined to treat medical or legal learning as something from which the ordinary person should be rigidly excluded. That attitude is due for reform.

If we wish to enjoy the respect and confidence of the general lay public, if our opinions on matters on which we can speak with authority are not to be regarded with suspicion, we must treat the layman as an intelligent being who should be steadily encouraged to prefer knowledge to ignorance, even in our own particular fields. It is gratifying, therefore, to see many of the fundamental facts of medical science, and many great modern discoveries, finding their way into the Press and into

¹Delivered at the inaugural meeting of the Medico-Legal Society of New South Wales on September 19, 1947.

popular and general literature. People distrust mumbo-jumbo. They like to be told plain facts in plain language. They respect and have confidence in the man who will tell them plain facts in plain language. Unfortunately, doctors and lawyers have had too little influence upon public opinion in matters in which the public should look to us for information and trust us. The plain truth is that doctors and lawyers are, in a sense, unpopular with the public. That is our fault, not theirs. The remedy lies with us and we must seek it, even if it does involve a liberalizing of some of our rules of etiquette.

But let us look to the future with the knowledge that both our professions have a long and great history, and that both have reason to be proud of their past.

The medical profession, in conjunction with its associated sciences, such as psychology, biology, chemistry, bacteriology, cytology, and latterly even physics, has conferred ever increasing benefits upon mankind. Some of those benefits have developed so quickly that the world has found it difficult to adjust itself to their consequences. Take one example. Since the beginning of this century there has been a substantial increase in the expectation of life. Fewer people are cut off in their youth, their prime, and their later middle life. That means fewer openings for younger people waiting to succeed to the positions of those higher up. It also means that there are more old people to be maintained by various forms of old age relief. Thus the blessing of a longer life brings with it a first class economic and political problem.

Medical science has, moreover, increased human efficiency during the prime of life by reducing the incidence and severity of many ailments that affect the daily work of the community. New mischiefs, however, have been found or intensified, such as gambling and industrial discord, whereby benefits which might have had great results to the community are out-balanced by evil and unhappy ways of life. The only real medical panacea would be a cure for human stupidity in its many and flourishing forms.

The lawyers too have played their part. It is largely to the lawyers of the past that the people of today can attribute their freedom from autocratic oppression—perhaps I should say the remnants of their freedom from autocratic oppression. Autocratic oppression can assume many forms; not merely the form of a Hitler, a Mussolini, and the rest of them, but also oppressions more insidious but just as real—the blackmarketeers, the bureaucrats, and that whole host of small fry who contribute their meed of inefficiency and arrogance in making life restricted and narrow. These men, from the most important and most dangerous down to the smallest and most insidious, have always been, and always will be, scowled upon with disfavour by the freedom-loving profession of the law.

Let me emphasize the attitude of the lawyer in these matters by referring to two ideas that are part of the very soul of the British lawyer. One is that a person charged with an offence is deemed to be innocent until he is proved to be guilty. Lately there has been a tendency, where bureaucrats have the making of regulations, within their ever increasing powers, to reverse that order, and to presume guilt unless the accused party can establish his innocence. Few laymen realize, as the lawyers realize, that the manacles of oppression are cast in that mould.

The other idea which is part of the lawyer's soul is that all judicial hearings must take place in public. The lawyer regards publicity of judicial hearings as one of the most treasured products of our history. Liberty thrives on publicity. Oppression and secrecy are inseparable. In 1913, years before Hitler became the archetype of evil and tried to dominate the world by secretly doing away with those who opposed him, the greatest court in the Empire used these words in relation to an undefended divorce case that had been heard behind closed doors:

One's experience shews that reluctance to intrude one's private affairs upon public notice, induces many citizens to forgo their just claims. It is no doubt true

that many of such cases might have been brought before tribunals, if only the tribunals were secret, but the concession to these feelings would tend to bring about those very dangers to liberty in general, and to society at large, against which publicity tends to keep us secure.

In that same historic judgement one finds this statement by Hallam, the historian, accepted as correct:

Civil liberty in this kingdom has two direct guarantees, the open administration of justice, according to known laws, truly interpreted, and fair constructions of evidence; and the right of Parliament, without let or interruption, to enquire into, and obtain redress of, public grievances. Of these the first is by far the most indispensable; nor can the subjects of any State be reckoned to enjoy a real freedom, where this condition is not found, both in its judicial institutions and in their constant exercise.

Let me take this opportunity to set at rest an argument that is sometimes advanced in favour of secret trials, at any rate in divorce cases, and even in criminal cases. I have heard it said that these trials draw an evil-minded crowd of spectators, who merely attend for the excitement of listening to evidence of immoral or brutal conduct. There is no truth whatever in that suggestion. I can tell you that, during the seven years that I have presided day after day in the Divorce Court, I have not once seen even one person in the public gallery whom I remotely suspected of being there in the expectation of hearing unsavoury evidence. Generally the public gallery is empty. When people are present they are mostly either parties or witnesses in the next case, or friends or relatives having a direct interest in the proceedings. The presence of the latter class is beneficial, because their mere presence often has a restraining influence upon a party or witness who might otherwise be untruthful. Occasionally a party has to give very distressing evidence, as in nullity cases. On these occasions the public, if any are present, and the Press reporters leave the court without being asked to do so. All that is necessary is for the judge to ask counsel whether the evidence is likely to be distressing and embarrassing to the witness; if counsel say that it is, the Press reporters leave and any others follow.

But let us not—lawyers and doctors, I mean—take ourselves too seriously. Like other great people, we have our peculiarities. One of those peculiarities has been, and still is, a tendency to express ourselves in other languages. The lawyers resort to Latin, and the medical profession resort to Latin and Greek; and I suspect that they do it for the same purpose, namely, for the purpose of keeping our knowledge to ourselves, and as a means of impressive escape from exposure of our ignorance.

For these purposes the lawyers use Latin (of sorts) a great deal; so do the physicians. The surgeons seem to have a preference for Greek—possibly in the vain hope that some of their secrets might remain hidden from the physicians.

I have been quite a successful patient in my time, and I can assure you that it is great comfort to the patient to have something that at least sounds like an ailment, even if it is only chronic hygieia.

Now the lawyers have a whole bookful of Latin sayings—"Broom's Legal Maxims" they call it. Every lawyer should know these Latin maxims, because nowadays so few people understand Latin that if you know your maxims you need not expose the empty spaces in your learning.

I strongly recommend "Broom's Legal Maxims" to the medical profession. Probably they would find them even more useful than the lawyers do. Take, for example, the maxim "*cum de corpore constat, falsa demonstratio non nocet*", which, translated, means "when you are sure the patient is a corpse, a wrong diagnosis does not matter". Consider also our familiar maxim of the law "*ut res magis valeat quam pereat*", which means, of course, as applied to medicine, "it is better for the patient to flourish than to perish". The third example always proves one's point, so let me commend to your attention yet another well-known legal maxim "*quod ab initio non valet, transitu temporis non convalescit*". The lawyer trans-

lates that as meaning "whatever is void to begin with, does not become valid with the mere passage of time". Changing the form of the first word "*quod*" to "*qui*" you have: "*qui ab initio non valet*", that is, "anyone who is not well to begin with", "*transitu temporis non convalescit*". That is, "does not recover with the mere lapse of time", or in other words, "anyone who is not well will not recover unless he goes to a doctor". What better words could be inscribed over the door of every surgery!

It is to be hoped that these few examples, taken at random, will convince the medical practitioner how much he could fortify his professional knowledge and aims by a careful study of "Broom's Legal Maxims".

On the other hand, when one asks, "What can the legal profession gain from the medical profession?" it is not sufficiently realized amongst the lawyers that a knowledge of medical science and practice would often be of great value in their understanding of life, and in the influence which they could exert upon the development of the law.

In my own field, matrimonial causes, I often wish that I had been a suburban medical practitioner for ten years, because there are many aspects of domestic life which no one understands as accurately and as sympathetically as the family doctor. Speaking for myself, I hope that the contact, to which I look forward, with my medical brethren in this society will help to resolve much that has baffled me in the understanding of human nature.

Let me turn from my own particular field to a branch of the law which is of great importance to the community—the law relating to mental conditions. Here indeed is a field in which the lawyer—especially the lawyer who aspires to enter political life, and in that way exert some constructive influence on affairs—could profit immensely by a practical and scientific understanding of mental conditions, their causes, and their proper treatment.

Mental illness and abnormality are matters which very deeply concern the welfare of our country as a whole. It is not merely a question of the provision of sufficient lunatic asylums for the incarceration of dangerously deranged persons, nor is it merely a question whether our provision for, and treatment of, these unfortunate people are as good as they should be, or as bad as they can be. As I see it, humanity is only just beginning to understand itself, and to study itself scientifically. Who can tell just where to draw the line between the normal and the abnormal mind, either as a whole or in any particular respect? By legal standards a person might be perfectly sane, and yet by medical standards be suffering from a psychosis or a neurosis undermining his usefulness in the community, or even rendering him a potential danger to others. The law, which in this respect is mostly statutory law, the law made from time to time by the people's representatives in Parliament, tends to confine itself to the more extreme conditions, namely, incapacity and lunacy, and to provide more particularly for restraint of the person and management of the property of the lunatic or incapable person. A century ago the treatment which the law, and the community, meted out to the insane was unspeakably barbarous. They were regarded as evil people rather than as sick people, and that history has, to this day, cast its forbidding shadow over the attitude of the law and the people towards mental infirmity.

The medical members of this society will probably agree that the law should make much more comprehensive provision for mental illness in its many forms than it does at present. But before nervous and mental conditions, including psychological conditions, can be brought within the broad purview of public health rather than the narrow scope of lunacy, it will be necessary for the general public to break away from past fears and prejudices. There is something about the word "mental" which evokes in the ordinary person a sense of horror and a feeling that some taint is necessarily involved. They refuse to recognize as "mental" any condition short of overt violence or dangerous eccentricity. Thanks to the use of such words

as "madhouse" and "lunatic asylum", which still linger in our midst, the public is not quite ready to accept the more enlightened view that mental, nervous and psychological conditions should come within the broad scope of public health. Indeed, I think the very words "lunacy" and "lunatic", linked as they are with a savage tradition, might well be abandoned in favour of more suitable terms. For the rest, enlightenment is a responsibility of the medical and the legal professions.

But, where widespread prejudices are involved, it is useless to talk about enlightenment without taking into account the people to be enlightened. Public prejudices are not easily overcome. The main thing to overcome is the widely held fear of every disorder to which the word "mental" is applied—the general view that there is a taint about it.

Who, I ask, are better qualified to mould public opinion in such matters than the followers of our two professions? But, to achieve anything, there are two essentials: we must take the public into our confidence and not treat them as people whose interest and curiosity should be suppressed; secondly, we must gain the trust of the public in ourselves and our knowledge—even above their trust in astrologists.

With a lawyer's dislike to secrecy, I take up stone and sling and hurl the first bolt against the crumbling fortress of anonymity, which has for too long barred the cohorts of progress. Surely our two professions are not devoid of ideas; surely we can so mould out etiquette as to yield something to a desire of the public to know who is professing to enlighten them, while securing ourselves against advertising abuses.

Having stated a few of the problems, I leave the rest to you.

The next great field in which our two professions can collaborate for the benefit of the community is that of criminal law, including the general treatment of crimes and criminals.

The lawyer, the psychologist and the moralist do not always agree about the essential nature of a crime; and I do not suppose they ever will. So much the better; since disagreement is at least a sign of intellectual vitality.

No one, I imagine, believes that a community, whatever degree of educational and social perfection may be reached, will ever be without its criminals. In the meantime, the legal and medical reformers have such different ideas about the best ways of dealing with the potential criminal in advance by prophylactic methods that there is plenty of room for discussion.

The remedial treatment—or punishment—of the person who has become an actual offender has changed considerably in the last century; from extreme severity in most cases to great leniency in many cases. The only present suggestion which I make, for early consideration, is that every first offender, whether punished or not, should be examined, and treated, by a small board of specialists in the diagnosis and treatment of antisocial conduct. If a large proportion of first offenders could, by proper treatment, be psychologically immunized against any further lapse, the result would be of great value to the community and its future generations.

I hesitate to refer to my own present branch of the law—matrimonial causes. For the past seven years I have been treating symptoms—which, my medical friends will admit, is an unsound method of treatment. Others, the family doctor, the social worker and the solicitor, are doing valuable work in treating the causes. Few people realize their work in preventing the breaking up of homes; and I wish to say this of solicitors in particular, that I have found, almost without exception, that if a reconciliation is at all possible, they always do their best to bring it about.

There remains one aspect of matrimonial law which calls for our urgent consideration—the custody of the children of a broken home. I mean custody in its broadest sense—the whole welfare of the children until they are properly able to be left to their own devices. These

children, owing to their upsetting experiences, are liable to become the troublesome people of tomorrow, and the community owes it to itself and to them to see that they get the best consideration possible, from the moment the suit is instituted. I am aware that any effective measures for better securing the welfare of these children might involve heavy public expense. However, as the public spends freely upon horses and greyhounds and the excitements which those animals provide, I regard with contempt any objection based on expense.

There is another matter to which I would like to refer. Every year there is an increasing tendency in the professions to specialize more and more at the expense of general knowledge. It is no longer considered necessary, or even desirable, for a professional man to have broadened his general outlook or to have fortified his mind to withstand the narrowing tendency of having only one intellectual interest, by building the professional superstructure upon a sound and lasting general education.

I may be expressing an outmoded idea when I tell you that it is my clear conviction that an advanced basic education, either in the classics or in modern languages and comparative philology, or in mathematics, or in history, or in psychology, makes the brain a better machine, and the mind more receptive over a wide field, and the judgement better balanced than they are without the aid of an early comprehensive training.

Let me take two instances to illustrate what I am stressing. One of the greatest and most liberal-minded Australian lawyers of all time was Leverrier. His legal knowledge was immense, his judgement perfectly balanced. But he was, as many of you may remember, not only a lawyer, but also a scientist of great attainments, a mathematician and a man possessed of wide general learning. All these contributed to his greatness as a lawyer.

Another great Australian, whom many of you will remember, was Edgeworth David. As a geologist he combined a great knowledge of detail of Australian geology with a remarkable capacity for evolving from detail a clear and comprehensive picture of the geological structure and history of the continent as a whole. Edgeworth David before he became a geologist was a classical scholar of considerable learning.

Each one of you, no doubt, will readily call to mind from your own experience professional men graced with the imprint of general learning; men who can leave the highroad of some specialized pursuit, and enjoy, with delight to themselves and their friends, the broad and lovely fields and bushlands of knowledge.

I suggest, therefore, that the great question of education, as it affects our two professions, is one which a society such as this might well examine.

Let it be understood, however, that I am not attacking specialization; it is both desirable and inevitable. What I am suggesting is that there should be a proper foundation beneath it.

At the risk of detaining you a little longer than I should, I pass to the last matter to which I invite your attention. We of the British race have developed over the centuries a form of constitutional government which particularly suits our character, our love of freedom and our deep dislike of anything savouring of autocracy. And we have developed concepts of law, and of the rule of law, which are admirably designed to secure us from invasion of our liberties, and to protect us from the dictatorship either of an individual or of any group of individuals claiming to exercise executive authority without responsibility either to the law or to the people.

As a result of the last two world wars, those precious things which we have inherited, which are the envy of less fortunate peoples, are in grave danger of being lost. That danger exists because the people, having enjoyed liberty for so long, do not notice its existence, and tend to neglect their duty of understanding and preserving it for themselves and for their children.

The continuance of parliamentary government as we have known it, of the responsibility of parliament and the executive government to the people, and of the rule of law, depends entirely upon a strong and articulate desire for their continuance on the part of a substantial section of the community.

You may ask what this has to do with a medico-legal society. Just this: without leadership no community can be anything but a decadent rabble. I use the word "leadership" in a large sense, as comprising not merely the active leaders of a State, but also the many who have a guiding or enlightening influence upon others. So far democracy has succeeded in our land, because leadership, loyal to its principles, has not been lacking. This has happened because a substantial portion of the people—and note that I say "portion" and not "class"—has qualified itself for leadership either by a broad and liberal education gained scholastically, or by balanced wisdom acquired by wide experience or wide reading.

That is where we enter the picture. There is no longer any leisured class to provide part of the necessary leadership; because, say what you like about the leisured groups of the past, they provided many men who devoted their lives to the service of the community. More and more, the general mass of the people will come to respect a man for his learning, be it learning in science, art, music, literature, or in one of the professions, or in anything else. These are the men upon whom depends the survival of democracy, of civil liberty, of the rule of law, of the responsibility of those who govern to those who are governed.

Therefore do I stress the first and paramount duty of all professional men—particularly of the lawyers because of their understanding of constitutional principles—to hold their education and their knowledge of humanity in trust for the benefit of the people, just as much as they hold their professional skill in trust for those who seek it.

In conclusion, I hope that such thoughts as I have been tempted to utter in the course of this address, if not acceptable to Minerva, might possibly be provocative enough to stimulate useful ideas in others. As I said, humanity is only just beginning to understand itself and to study itself scientifically.

This society has sprung into life at one of the greatest and most anxious periods of all history; at a time when it was never more necessary for all men of special learning to accept their responsibilities towards the community. Let us, therefore, following the example of other learned associations in our land, proceed to fulfill our aims and ambitions of useful achievement.

THE PHYSIOLOGICAL ACTIVATION OF PROTHROMBIN.

By P. FANTL and MARGARET H. NANCE,¹

From the Baker Medical Research Institute,
Alfred Hospital, Melbourne.

EVIDENCE has been produced that the conversion of prothrombin to thrombin in normal human plasma is accelerated by a plasma component (Fantl and Nance⁽¹⁾). Animal plasmas show greater activity than human plasma in this respect (Fantl and Nance⁽²⁾). The active principle has the properties of a globulin (Fantl⁽³⁾). Shortly after the announcement of these findings a rare haemorrhagic state called parahæmophilia was described by Owren,⁽⁴⁾ who, after thoroughly investigating the condition, came to the conclusion that it was due to a deficiency of a new component of the clotting system, termed "factor V", essential for thrombin formation in addition to prothrombin. Evidence for the identity of prothrombin accelerator and Owren's factor V will be given here.

¹ Working with a full-time grant from the National Health and Medical Research Council.

Experimental Investigation.

Oxalated plasma was obtained by the addition of one volume of 0.1 molar sodium oxalate solution to nine volumes of whole blood, followed by centrifugation for ten minutes at 3000 revolutions per minute. The term "fresh plasma" refers to specimens investigated not longer than eight hours after collection. "Alumina plasma" was prepared by treating fresh plasma with 10% of its volume of a suspension of C gamma alumina gel, at room temperature for periods up to one hour to ensure complete removal of prothrombin as judged by the Quick prothrombin test.

Thrombin was made according to Eagle's technique.⁽⁶⁾ Fibrinogen solutions were prepared from oxalated plasma after treatment with a barium sulphate suspension. For its separation either Jacques's modification of Florin's method⁽⁶⁾ or precipitation with 25% ammonium sulphate solution was used. In both cases three successive precipitations were carried out. All procedures were performed at a temperature below 10° C. The fibrinogen solutions were dialysed for twenty-four hours against 0.15 molar saline solution containing 0.01 molar sodium oxalate. The pH of the fibrinogen solution was adjusted prior to use to 7.4 to 7.6 by the addition of sodium bicarbonate.

Quantitative estimations of prothrombin, fibrinogen and other proteins were carried out by the Biuret test as described in a previous paper (Fantl and Nance⁽⁷⁾) and the results were expressed as milligrammes per centum of protein nitrogen. The purity of the fibrinogen solutions was further determined by coagulation with thrombin and estimation of the resultant fibrin. Only preparations of purity greater than 98% were used.

Prothrombin estimations by the one-stage technique (Quick⁽⁸⁾) were carried out with homologous brain extract and 0.01 molar calcium chloride solution. Human or animal brain powders were prepared according to Quick⁽⁸⁾ and 3% to 6% extracts of pH 7.4 were made up in "Veronal" and saline solution. These were heated for fifteen minutes at 50° C., or as stated in the respective experiments.

The time of clotting of fibrinogen by thrombin is dependent on a variety of factors. Preliminary tests were carried out in order to find the optimal concentration of fibrinogen for both the thrombin-fibrinogen and the prothrombin reactions. Fresh human oxalated plasma or alumina plasma and purified fibrinogen solutions were diluted with 0.15 molar saline and "Veronal" buffer solution at pH 7.4 to 7.6.

In Figure I curve A refers to the results obtained with three specimens of human oxalated plasma, and curve B

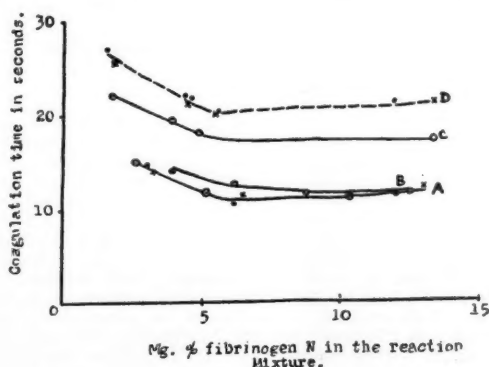


FIGURE I.

to purified fibrinogen. To 0.2 millilitre of the solution was added 0.1 millilitre of a thrombin solution and the coagulation time was measured at 37° C. Curves C and D represent human oxalated plasma diluted to 12.5% prothrombin concentration. The diluents were human oxalated plasma from which fibrinogen had been removed in varying amounts by thrombin, and after that pro-

thrombin removed by treatment with alumina gel. The prothrombin test was carried out according to Quick's procedure.

The results indicate that in both the thrombin and prothrombin reactions a fibrinogen nitrogen concentration below 5.0 milligrammes per centum in the test mixture delays coagulation time, whilst higher concentrations up to 20 milligrammes per centum have little influence. Consequently in all further experiments the fibrinogen solutions used were adjusted to between 40 and 60 milligrammes per centum of fibrinogen nitrogen, which gave 13 to 20 milligrammes per centum in the test mixture.

Preparation of Prothrombin.

For the isolation of prothrombin from oxalated plasma two procedures have been employed. The one consisted of adsorption of prothrombin on barium carbonate as described previously (Fantl and Nance⁽⁷⁾). The adsorbate, washed free of protein, was decomposed by the calculated amount of 0.1 normal acetic acid and dialysed against distilled water for twenty hours.

A more expedient procedure was found to be the elution of prothrombin from barium sulphate adsorbates. The following technique was found to be satisfactory.

Twenty millilitres of oxalated plasma, free of cellular elements, were treated with a suspension of barium sulphate in such an amount as to remove approximately 90% of prothrombin. The adsorption was carried out for fifteen minutes with occasional shaking, and the suspension was centrifuged and washed with cold isotonic saline solution till protein-free. The adsorbed prothrombin was eluted with ten millilitres of Sørensen's phosphate buffer, 0.066 molar, at pH 7.8 to 8.0, for ten minutes. The temperature, except for centrifugation, was kept between 0° and 5° C.

The following example illustrates this procedure. Fresh human oxalated plasma treated with barium sulphate suspension had a clotting time of 187 seconds by Quick's technique, which indicated that more than 90% of the prothrombin had been removed. The barium sulphate sediment was eluted with phosphate buffer solution at pH 5.3, but the eluate did not clot when mixed with prothrombin-free plasma, and a nitrogen estimation showed that it contained only traces of protein. An elution was then carried out with phosphate buffer solution at pH 8.0, and the eluate when mixed with prothrombin-free plasma in the ratio 1:2 gave a clotting time of eighteen seconds, corresponding to 35% of prothrombin; hence the yield of prothrombin eluted was approximately 52%. A micro-Kjeldahl estimation on this eluate showed that 0.240 milligramme of protein nitrogen had been removed, and a Biuret test on the eluted barium sulphate gave 0.345 milligramme of protein nitrogen. Hence the total amount of protein nitrogen in the eluate plus residue was 0.585 milligramme as compared with 0.565 milligramme, which was estimated by the Biuret test on the barium sulphate adsorbate from a similar sample of plasma. A further elution with phosphate buffer solution at pH 8.0 yielded not more than 20% of prothrombin. Prothrombin prepared in this way has retained its activity for at least nine days when stored at 0° C. Because of the presence of 0.066 molar phosphate, the solution must be diluted to at least 0.022 molar phosphate, a concentration which does not inhibit thrombin formation. Chemical analysis of the protein isolated from the phosphate eluate and dried over phosphorus pentoxide at room temperature contained 12.2% of nitrogen (Kjeldahl) and 2.25% of glucosamine.

A two-stage technique was used in the assay of the isolated prothrombin. In order to make the results comparable with those obtained with the one-stage technique, the following procedure was adopted. Of the prothrombin solution, 0.4 millilitre was incubated at 20° C. with 0.8 millilitre of an homologous brain extract and 0.8 millilitre of 0.01 molar calcium chloride solution. This concentration of calcium ions was found optimal. The pH of the test mixture was 7.4 to 7.6. To 0.2 millilitre of this test mixture was added 0.1 millilitre of a fibrinogen solution containing 40 to 60 milligrammes per centum of fibrinogen nitrogen of the same ionic strength and pH as the test mixture. The clotting time was measured at 37° C.

When prothrombin was isolated by the above procedure from fresh and aged plasma, it was observed that in the former case the conversion rate of prothrombin was much faster than in the latter; but even in plasma that had been stored for four weeks at 20° C., active prothrombin preparations were obtained. Only fibrinogen solutions and brain extracts were used which did not

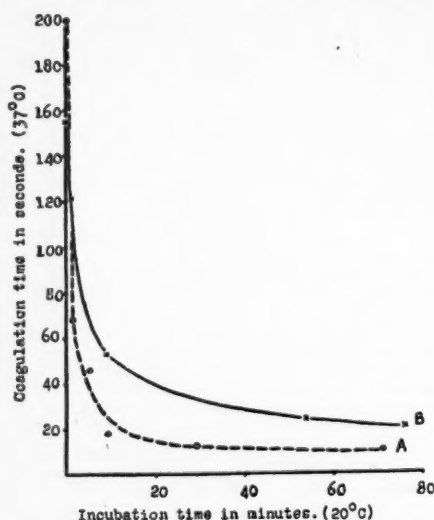


FIGURE II.

contain detectable amounts of prothrombin or prothrombin accelerator.

In Figure II, curve A refers to prothrombin isolated by the barium sulphate procedure from fresh plasma. Curve B refers to that isolated from plasma stored for four weeks at 20° C. This stored plasma showed a prothrombin time by Quick's test of more than four hours, the pH was 8.8, and a 1:1 mixture with fresh prothrombin-free plasma

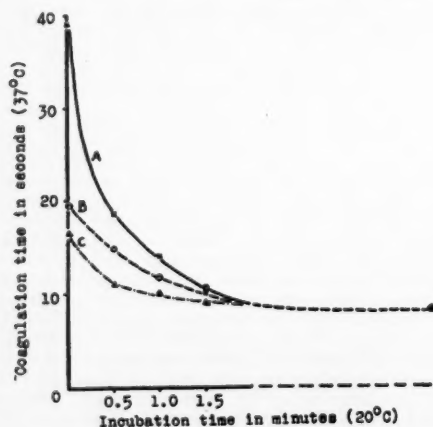


FIGURE III.

gave a clotting time of twenty-five seconds. The brain extracts used were at a concentration of 3% in "Veronal" and saline solution which had been heated to 50° C. for fifteen minutes or to 60° C. for twenty minutes. Although in the latter case the thromboplastic activity was reduced, essentially similar results to those recorded were obtained, which indicated that the brain extract did not contribute factors other than thromboplastin.

Preparation of Prothrombin Accelerator.

In the preparation of prothrombin accelerator three different procedures were used.

First Procedure.—Alumina plasma was diluted ten times with distilled water, the solution was chilled in ice and saturated with carbon dioxide, and a drop of octyl alcohol was added to prevent foaming. The precipitate was collected by centrifugation and dissolved in half of the original plasma volume of a solution containing 0.15 molar sodium chloride, 0.01 molar sodium oxalate and 0.022 molar sodium bicarbonate. The final pH was 7.4. Results indicate that the accelerator is present in this euglobulin fraction. The preparations contained 143 milligrammes per centum of protein nitrogen, of which 45 milligrammes per centum were fibrinogen nitrogen. Prothrombin was absent. For the testing of this fraction for accelerator activity no extra fibrinogen was added.

In Figure III, curve A represents prothrombin isolated from fresh plasma by the barium sulphate procedure and assayed with fibrinogen. Curve B is the same assayed with accelerator obtained by the first procedure, and curve C the same assayed with alumina plasma.

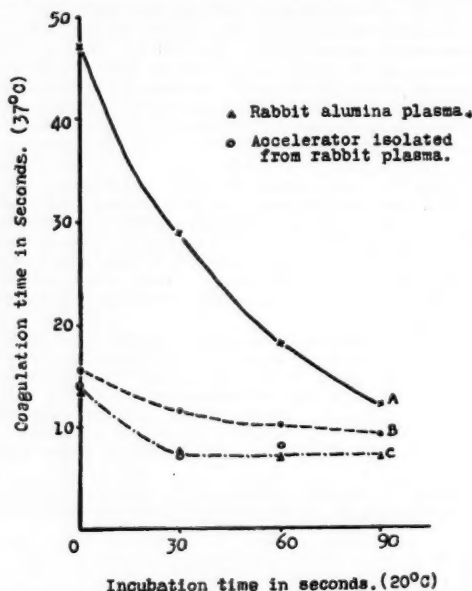


FIGURE IV.

Second Procedure.—Oxalated plasma was treated with sufficient barium carbonate or barium sulphate suspension in the cold for fifteen minutes to remove prothrombin. The filtrates were diluted with two volumes of water and neutral saturated ammonium sulphate solution was added to give a 30% saturation. The precipitate was filtered off in the cold and discarded. The filtrate was brought to 45% ammonium sulphate saturation, and the precipitate was collected by cold centrifugation, well drained, and dissolved in four-tenths of the original volume of distilled water. This solution was dialysed for twenty-four hours against cold 0.15 molar sodium chloride solution containing 0.01 molar sodium oxalate, and finally sodium bicarbonate was added to produce a pH of 7.4. The total protein nitrogen content of the solution was 240 milligrammes per centum, of which less than 10 milligrammes per centum were fibrinogen nitrogen.

In Figure IV, curve A indicates prothrombin isolated by barium sulphate adsorption and assayed with fibrinogen. Curve B is the same assayed with human alumina plasma. Curve C is the same assayed with either rabbit alumina plasma or accelerator isolated from rabbit plasma by the second procedure. To an equal volume of fibrinogen solu-

tion 0.05 millilitre of the accelerator was added. Between thirty and sixty seconds' incubation at 20° C. were found sufficient to produce maximum thrombin formation, and such products could be stored for one week at 0° C. without loss of activity.

Third Procedure.—Experiments to obtain a potent prothrombin accelerator from alumina plasma by removing fibrinogen with thrombin were not always successful. Likewise filtrates from phosphate precipitation of fibrinogen were found to have little activity.

Comment.—It appears that the most active and stable preparations are obtained by the second procedure described.

TABLE I.

Prothrombin.	Clotting Time in Seconds.
Prothrombin assayed with fibrinogen	141
Prothrombin assayed with accelerator (human) .. .	39
Prothrombin assayed with accelerator (rabbit) .. .	15
Prothrombin assayed with accelerator (rabbit) heated for five minutes to 60° C. .. .	68
Prothrombin assayed with accelerator (rabbit) heated for ten minutes to 60° C. .. .	89

Heat Stability of Prothrombin Accelerator.

To investigate the influence of temperature and storage time on stability, the accelerator was prepared from human plasma which had been stored at 20° C. for varying periods. Only samples which were found to be sterile and without change in fibrinogen concentration were used. From the results it appeared that a gradual decrease occurred, and as can be seen from the following summary, after four to five weeks' storage at 20° C. no activity was found in the globulin fraction.¹ However, prothrombin could still be isolated (Figure II). The summarized observations are as follows.

Human plasma was stored for four weeks at 20° C. and had a prothrombin time (Quick) of four hours.

TABLE II.

The Influence of the Globulin Fraction on the Thrombin Reaction.

Substrate.	Clotting Time in Seconds.	
	50% Dilution with 0.15 Molar Sodium Chloride and 0.01 Molar Sodium Oxalate Solution.	50% Dilution with Globulin Fraction.
Fibrinogen	25	30
Human alumina plasma	40	42
Rabbit alumina plasma	35	38

Prothrombin was prepared from it by barium sulphate adsorption and elution with phosphate buffer solution at pH 7.8 (Figure II), and the globulin fraction was prepared by the second procedure. Fibrinogen was prepared from fresh plasma. The clotting time of prothrombin with fibrinogen was 220 seconds, that of prothrombin with fibrinogen and globulin was 230 seconds, and that of prothrombin with human alumina plasma was 39 seconds.

Prothrombin was isolated from plasma stored at 6° C. for seventeen days and accelerators were prepared from fresh rabbit plasma and from the stored plasma by the second procedure. The Quick prothrombin time of the stored plasma was seventy-one seconds. Both preparations of accelerator were free from prothrombin and thrombin.

As is indicated in Table I, more than ten minutes' heating at 60° C. is necessary to destroy the active principle.

¹ It may be pointed out in this connexion that the gradual disappearance of the accelerator during storage is only one of the factors responsible for the delayed prothrombin time of stored plasma, as will be shown later. (Fanti and Nance.⁽⁹⁾)

Activating influence of the Globulin Fraction.

That the active principle present in the globulin fraction is an accelerator of prothrombin and not of thrombin can be seen from experiments in which its influence was tested on a variety of substrates containing fibrinogen.

Prothrombin accelerator was prepared from fresh rabbit plasma treated with barium sulphate according to the second procedure. Equal volumes of fibrinogen containing substrates and 0.15 molar sodium chloride solution plus 0.01 molar sodium oxalate or accelerator were prepared. To 0.2 millilitre of these mixtures was added 0.1 millilitre of thrombin at 37° C.

TABLE III.

Coagulation Times of Fresh and Stored Plasma (Four Weeks at 6° C.) with Brain Extract and Russell Viper Venom as Thromboplastic Agents (One-Stage Technique).

Plasma.	3% Human Brain Extract in "Veronal" and 0.01 Molar Calcium Chloride Solution.	Russell Viper Venom with Lecithin and Calcium Chloride Solution.
Fresh plasma	14.5 seconds	15.0 seconds
Alumina plasma	No clot	No clot
Stored plasma	71.0 seconds	82.0 seconds
Stored plasma with alumina plasma (1:1)	15.5 seconds	25.0 seconds
Stored plasma with alumina plasma (1:2)	16.0 seconds	27.0 seconds

The slight inactivating influence of the globulin fraction on the thrombin reaction is probably non-specific and due to differences in the oxalate concentration in the two series.

Prothrombin Activation by Russell Viper Venom.

In all previous experiments the thromboplastin preparations were human or animal brain extracts. In further investigations the combination of Russell viper venom, lecithin and calcium ions was used as thromboplastic agent. It had the following composition: 0.5 millilitre of a 1% commercial egg lecithin in "Veronal" buffer solution to produce pH 7.2 plus 0.5 millilitre of 0.02% Russell viper

TABLE IV.

Comparison between Prothrombin Times Estimated by the Use of Homologous Brain Extract and With Russell Viper Venom and Lecithin (One-Stage Technique).

Species.	Homologous Brain Extract (Seconds.)	Russell Viper Venom (Seconds.)
Human (5) ¹	11 to 13	10 to 12
Rabbit (9)	6 to 8	8 to 10
Guinea-pig (8)	20 to 22	9 to 10

¹ Figures in parentheses indicate the number of specimens tested.

venom ("Stypven") was mixed and 1.0 millilitre of 0.025 molar calcium chloride solution was added. To 0.1 millilitre of plasma was added 0.2 millilitre of this mixture and the clotting time measured at 37° C.

Results given in Table III indicate that the phenomena in fresh or stored plasma are similar for both types of thromboplastin preparations.

It appears that, however, quantitatively the mechanism of Russell viper venom activation is different from that of tissue extracts. Evidence for such an assumption is that in contrast to brain extract, the Russell viper venom, lecithin and calcium system produces prothrombin times which are similar in a variety of animal plasmas (see Table IV).

Again in contrast to brain extract, we have not observed any activating influence following the addition of prothrombin-free plasma to fresh plasma when Russell viper venom was used as thromboplastin, as can be seen from Table V and Figure V.

The curves in Figure V represent results obtained with guinea-pig plasma. Curve A indicates prothrombin times

TABLE V.
Comparison between Prothrombin Estimation of Human Oxalated Plasma by the Use of Homologous Brain (A) and Russell Viper Venom (B).
(One-Stage Technique.)

Plasma Concentration. (Per Centum.)	Clotting Times in Seconds with Diluents as Under.					
	0.8% Sodium Chloride Solution.	Barium Sulphate Plasma.	Accelerator. ¹	0.8% Sodium Chloride Solution.	Barium Sulphate Plasma.	Accelerator. ¹
100.0	14.0	14.0	14.0	14.0	14.0	14.0
50.0	15.5	15.0	12.5	15.5	17.5	17.5
25.0	23.0	20.0	14.5	21.0	23.5	26.5
12.5	40.0	27.0	18.0	35.0	32.5	43.5
	A			B		

¹ Accelerator was prepared from barium sulphate solution and plasma from which fibrinogen was removed by the addition of thrombin.

obtained when homologous brain extract and 0.15 molar saline solution were used as diluent; curve B represents the same diluted with homologous plasma from which prothrombin has been removed by barium sulphate adsorption; curve C represents a saline dilution curve obtained when viper venom was used; and curve D represents the same when barium sulphate plasma was used as diluent.

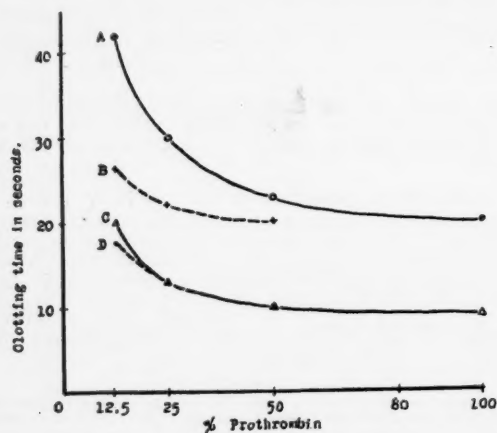


FIGURE V.

Discussion.

Several observers have noted that isolated prothrombin was converted at greatly differing velocities into thrombin. Seegers *et alii*⁽¹⁰⁾ believed that the slow conversion rate of isolated preparations of prothrombin was due to the relative insolubility of the purified thromboplastin. Astrup⁽¹¹⁾ surmised that an unknown factor was responsible for the velocity of thrombin formation. Quick,⁽¹²⁾ however, was the first worker who made a definite assumption from the fact that in oxalated plasma coagulation diminished on storage and could be restored by addition of fresh prothrombin-free plasma. Quick postulated that the prothrombin molecule consisted of two components, A and B, the former disappearing during storage. Seegers, Loomis and Vandenbelt⁽¹³⁾ and Loomis and Seegers⁽¹⁴⁾ denied the existence of prothrombin A, but Ware, Guest and Seegers⁽¹⁵⁾⁽¹⁶⁾ have accepted our view and terminology of the prothrombin accelerator. The experimental evidence produced here indicates that the prothrombin accelerator and Owren's factor V are identical, as can be seen from the comparison of their properties set out in Table VI.

Although the active principle is present in the globulin fraction, the preparations are not sufficiently pure for chemical characterization at present. Several preparations did show thromboplastic activity, but the evidence so far obtained does not permit comparison of the accelerator with the "thrombokinas plasmatique" of R. Feissly,⁽¹⁷⁾

a substance which is present in normal plasma and is considered a true thrombokinas. From the fact that the globulin fraction isolated from plasma treated with barium sulphate or barium carbonate has no thrombic action on fibrinogen or alumina plasma, this product cannot be identical with the clotting globulin described by Parfentjev.⁽¹⁸⁾

TABLE VI.

Substance.	Globulin Precipitated by Carbon Dioxide.	Precipitated by 45% (NH ₄) ₂ SO ₄ .	Destroyed by 20 Minutes' Heat at 60° C.	Disappears on Storage.
Owren's Factor V	+	+	+	+
Quick's prothrombin	+	+	+	+
Prothrombin accelerator	+	+	+	+

Summary.

A convenient method for the preparation of highly potent prothrombin solutions has been developed. Fresh oxalated plasma contains a factor responsible for the rapid conversion of prothrombin to thrombin when thromboplastin from animal tissues is used. It is called prothrombin accelerator, and the active principle is connected with the globulin fraction. It is heat labile and gradually disappears from stored plasma. It has no effect on thrombin. The principle is identical with Owren's factor V and probably with Quick's prothrombin A.

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RECENT PROGRESS IN PÆDIATRICS.¹

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Influenza Bacillus Meningitis.

THE several steps by which control over influenza bacillus meningitis has been established in recent years form one of the most striking advances in the treatment of children's diseases.

Only twelve years ago, influenza bacillus meningitis was one of our most dreaded infections, for it was not only the commonest form of meningitis found among young children, but it was almost always fatal.

The first step towards the control of this alarming illness came with the introduction of the "sulpha" drugs. Sulphanilamide was useless; but sulphapyridine wrought occasional cures, and there was one such case at the Brisbane Children's Hospital in 1940. Sulphadiazine was a good deal more successful; in 1946, North, Wilson and Anderson reported a 22% recovery rate among 150 children so treated.

The second step was the introduction of a specific *Hæmophilus influenzae* antibacterial serum, prepared in rabbits, which became available in Australia in 1944. This serum is best used by the intramuscular route. Intravenous administration causes a profound reaction, and serum given intrathecally is not only ineffective but may be deleterious. Use of this serum in conjunction with sulphadiazine reduced the mortality rate to about 50% or lower. North, Wilson and Anderson, in the paper quoted above, collected 81 cases with a recovery rate of 55.8%; Baltimore workers recorded 28 consecutive cases with an 85% recovery rate; and at the Adelaide Children's Hospital 17 children were treated over a three-year period with only two deaths. Dosage recommendations vary from 120 to 250 millilitres, but all workers agree that serum should be given early and plentifully enough to let the patient's plasma, when diluted 1:10, remain capable of agglutinating the bacilli. Our usual dosage at the Brisbane Children's Hospital is 90 millilitres, 60 millilitres, 30 millilitres, respectively, on the first three days.

The rabbit serum is intended to be used in conjunction with sulphadiazine, not alone. Large doses of sulphadiazine are required to produce therapeutic levels in the cerebro-spinal fluid. The risk of renal complications and leucopenia is less than the risk the patient already faces with his meningitis. In none of the Adelaide Children's Hospital cases did the patient receive less than 60 grammes of sulphadiazine over a four-week period, and most of the patients were under two years of age.

Generally speaking, influenza bacilli are resistant to penicillin, but in many strains this resistance is only relative and larger quantities of penicillin inhibit growth on culture media. Since 1945 articles have appeared in the literature drawing attention to this fact. From the practical aspect penicillin sensitivity of influenza bacilli is sufficiently common to justify the intrathecal administration of 20,000 units daily until the cerebro-spinal fluid is sterile. In the early septicæmic stage (and in 78%

of cases a culture can be grown from the blood) the intramuscular administration of penicillin in large doses is also justifiable. Serum and sulphadiazine are, of course, given at the same time.

The newest weapon to be put into the hands of those fighting influenza bacillus meningitis is streptomycin, to which most strains of the organism seem to be highly vulnerable. In her first paper on the subject, Dr. Hattie Alexander, of Columbia University, who is perhaps the greatest authority on the disease, stated that streptomycin alone seemed just as effective as streptomycin and sulphadiazine. However, Dr. Alexander modified her views in a later paper, after finding that in heavy infections streptomycin-resistant strains of *Hæmophilus influenzae* were apt to emerge; and she now advocates the combined use of streptomycin, sulphadiazine and specific antiserum. The recommended dose of streptomycin is 20,000 units (20 milligrammes) per pound of body weight daily, given intramuscularly every three hours in eight equal doses in a concentration of 50 milligrammes per millilitre, together with 25 to 50 milligrammes given intrathecally once daily until the cerebro-spinal fluid has been sterile for three days.

So far five children have been treated in this way at the Brisbane Children's Hospital and all have recovered. No complications attributable to streptomycin have been noted.

Hæmolytic Disease of the Newborn.

About 1941, new light was thrown on *erythroblastosis fetalis*, the mysterious disease of the newborn characterized by anæmia, jaundice or oedema, when it was shown that the red blood corpuscles of the fetus often carried a factor (usually the Rh factor) derived from the father, but sometimes absent from the mother's red cells. To this factor the mother occasionally became sensitized, her serum developing the capacity to destroy her own baby's (or any similar) red blood corpuscles. Some of this destructive antigen subsequently found its way into the baby's circulation, so that in-vivo destruction of its red blood cells, and possibly of other tissue cells, occurred before birth or during the first few weeks of life.

In recent years much has been written on the Rh factor. Out of every 100 married couples there will be approximately 13 Rh-negative women with Rh-positive husbands, but a very much smaller percentage actually bear erythroblastic babies. Perhaps, as Wiener has suggested, some "genetically inherited capacity to be sensitized" is necessary. Furthermore, trouble is seldom experienced with the first baby, but it becomes more common and severe with later pregnancies, each one adding to the sensitization already established. It is well to remember that an Rh-negative woman may be sensitized at any time during her girlhood or reproductive period by a transfusion of Rh-positive blood. As a result even her first pregnancy can end in disaster to the infant.

The fetus seems to sensitize its mother less while being carried than actually at parturition, because of disturbance of the placental site. As the Rh factor is attached to red cells and is not free in the plasma, it is necessary for some of the fetal red cells actually to enter the mother's circulation before sensitization can occur. This is not difficult, for in the latter part of pregnancy only a single layer of syncytial cells separates the fetal blood vessels from the maternal sinuses.

It is important, therefore, to determine the Rh type of every pregnant woman. The husband should be typed also if his wife is found to be Rh-negative, and her serum should be searched for anti-Rh agglutinins. In special cases the expectant mother's serum should be examined for other abnormal agglutinins. There is always the possibility of her being sensitized to factors in her husband's blood (for example, A or B factor) which she herself lacks. Not every case of erythroblastosis can be blamed on the Rh factor.

Two sets of Rh antibodies, agglutinating and "blocking", may be detected in the mother's serum. There are grounds

¹ A post-graduate lecture.

for believing that the presence of "blocking" antibody indicates a graver prognosis, and in particular a greater risk of still-birth. This may be because it is a smaller molecule and crosses the placenta more readily.

We cannot yet explain why some babies sustain damage to their red cells only and develop a pure hæmolytic anæmia, whereas others have liver and brain damage and others again are stillborn, usually with generalized oedema. The obvious explanation, that in some cases the Rh factor is attached to red cells only, whereas in others it may be attached to liver cells and brain cells, remains to be proved. The practical point is that no baby need die, and in my experience never has died, of hæmolytic anæmia alone. Such babies can always be saved by blood transfusion, repeated as often as necessary. On the other hand, some infants will die of jaundice and kernicterus in spite of everything, and of those who survive some will exhibit permanent liver or brain damage.

Although the practice of inducing labour in these cases two or three weeks before term is gaining popularity in the United States of America it is not yet generally adopted here. I am sure it would be of advantage. The mother's antibody titre generally rises during the last month and many a fetus, stillborn at full term, was known to have been alive a fortnight earlier. Dr. Louis K. Diamond, of Boston, claims that between 1942 and 1944 treatment by transfusion with Rh-negative blood resulted in a 30% mortality rate; but during the next two years, under the same treatment plus delivery before term, the mortality rate fell to 20%.

Exsanguination or exchange transfusion has received newspaper publicity. The object of this procedure is to relieve the infant, at the earliest opportunity, of as many of his vulnerable Rh-positive red corpuscles as possible, and of much of his plasma with its acquired antibody content, and to replace both with inert Rh-negative blood. Indications for such an undertaking are a bad maternal history; rising maternal antibody titre; raised maternal icteric index; icteric amniotic fluid; a large pale placenta; and signs of jaundice, anæmia, oedema or petechiæ in the infant. We have carried out a number of exchange transfusions in Brisbane in suitable cases, but the procedure is still in the experimental stage, and there are technical difficulties about it. Diamond, however, claims that, used in conjunction with early delivery, it has further reduced the mortality rate of *erythroblastosis foetalis* approximately to 10%.

Congenital Syphilis.

In Queensland congenital syphilis is relatively uncommon, but cases still occur when least expected. Treatment used to be a wearisome business of repeated courses of bismuth and arsenical injections extending over years, interspersed with mercury inunctions, and it promised no certainty of cure. A child now under my care was treated since infancy in this way and paid innumerable visits to the out-patient clinic, but today, at the age of nine, despite all our trouble and all his pain, he is developing juvenile paresis.

Penicillin, used in infancy, can help to avert such tragedies. Here are some figures from an analysis published early this year in *The Journal of the American Medical Association*. A series of 252 congenital syphilitic infants were treated with a single course of penicillin lasting seven to fifteen days. The results were satisfactory in 73% of cases. There was a case fatality rate of 10.7%, but most of the deaths were due to causes other than syphilis, a fact which emphasizes that the treatment of the baby is even more important than the treatment of its syphilis. Only 2.4% of clinical relapses were encountered at intervals of three to eleven months after penicillin was given. The serum of most infants ceased to yield evidence of syphilis between the fourth and twelfth month after treatment.

When penicillin is injected intramuscularly spirochaetes disappear with amazing rapidity from the local lesions, and usually no viable organisms can be found after four to eight hours. Herxheimer reactions occur fairly often.

Experience has proved the value of large doses of penicillin—100,000 to 200,000 units per kilogram, divided into three-hourly injections over a period of twelve to fifteen days. For example, an eleven-pound (five-kilogram) baby would require 5000 to 10,000 units three-hourly for twelve and a half days.

It is as yet undecided whether additional treatment with arsenic or mercury is necessary. For late congenital syphilitic lesions, such as interstitial keratitis, penicillin is of no value.

Conservative Treatment of Acute Osteomyelitis.

From the time when it first became available penicillin was used in the treatment of acute osteomyelitis as an adjunct to surgery. But it was not long before attempts were being made to cure osteomyelitis by the use of penicillin alone without recourse to operation.

In 1945 Altmeier and Helmsworth published their results from 34 cases of such treatment. They had one death and a greatly reduced incidence of metastatic complications, although the blood of no less than 20 of their patients yielded cultures of microorganisms. Surgical intervention was confined to osteotomy in five cases and periosteal incision and drainage in 12. The other 17 patients had no operation whatever and recovered in a matter of weeks.

Since that time there have been numerous reports in the literature of patients successfully treated by medical means; sometimes with penicillin in combination with a "sulpha" drug, sometimes with penicillin alone. One British surgeon used to preface his treatment by marrow puncture, which permitted identification of the offending organism, helped to relieve tension and provided a route for the introduction of penicillin. However, he found that the marrow cavity became sterile in about fourteen days whether the penicillin was introduced by the intramuscular or the intramedullary route, and he prefers the former.

The first child to be treated by medical means alone at the Brisbane Children's Hospital was admitted in October, 1944. He was a boy of three years of age with acute osteomyelitis of the lower end of the femur.

He received a million units of penicillin over a period of thirteen days and also 30 grammes of sulphadiazine during the first ten days. One had an anxious time for the first three days, wondering whether to operate, while the local condition seemed to grow worse; but he improved on the fourth day and was discharged from hospital, cured, on the eighteenth day.

Between October, 1944, and June, 1946, 24 Brisbane children were similarly treated. In this small series there were no deaths and no metastatic infection in other bones from the time of commencing treatment. Only one child in the series developed a sequestrum; two others had subperiosteal abscesses drained. The average length of stay in hospital was four to five weeks. Beyond minor local flares in a few instances there were no recurrences. Of these children, 19 have been seen recently after an interval of twelve to twenty-one months and, except in the case above mentioned, there has been no sequestrum formation and no relapse.

It seems reasonable to conclude that early surgical intervention, with guttering or drilling of bone, is no longer necessary and that the management of acute osteomyelitis, in children at least, has become a medical rather than a surgical problem.

Rheumatic Fever.

Although less common in Queensland than in some parts of the world, rheumatic carditis takes its toll of life and liberty even here.

The causal agent remains unknown. For years streptococci have been suspected. Coburn's view is that the symptoms are caused by an inadequate immune response to infection with group A hæmolytic streptococci, permitting the continued elaboration of streptococcal antigens and sensitization of the reticulo-endothelial system. It may also be that streptococcal infections facilitate the entry of a virus.

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The only certain fact is that such infections precede relapses. Accordingly, attempts have been made at control by long-continued sulphonamide administration, and these have met with some success. A variety of different sulphonamides have been used for the purpose, but sulphadiazine is perhaps the best. The accepted dose for a child is 0.5 gramme (one tablet) twice daily, which ensures a blood level of one to three milligrammes per 100 millilitres.

Members of the staff of the Hospital for Sick Children, Great Ormond Street, have published an analysis of the results of six comprehensive trials of sulphonamides, used prophylactically on more than 500 rheumatic children and young adults. The relapse rate proved to be only 1.2% in the treated group, compared with 19.8% in approximately the same number of untreated controls. Only one team of investigators found prolonged therapy to be impracticable. The others observed no deterioration in general health or mental ability and reported that the children led normal lives while under treatment.

All investigators agree that sulphadiazine prophylaxis must be continued until adolescence, probably for a minimum of five years. Protection ceases when the treatment is stopped, and patients again become liable to relapse. Toxic reactions are generally mild, consisting of rashes, fever, gastro-intestinal disturbances and moderate leucopenia in a few cases. Only subjects willing and able to attend clinics regularly should be chosen. Sulphadiazine should not be given until the acute attack of rheumatic fever has subsided, but one need not wait until the sedimentation rate becomes normal.

There is still no cure for rheumatic fever. Hopes were raised by Coburn's claim, in 1943, that at sufficiently high plasma salicylate levels (35 milligrammes per 100 millilitres) the rheumatic process could be suppressed and permanent heart damage avoided, but his work was carried out on adults and similar results have not been obtained with children. We submitted three patients at the Brisbane Children's Hospital to massive doses of sodium salicylate given intravenously, according to Coburn's technique, but two of them developed salicylate poisoning and none showed the slightest improvement. Some American investigators treated 186 patients and found that heavy salicylate dosage produced no reduction in the time of attainment of a normal blood sedimentation rate, no reduction in the recurrence rate, and no reduction in the incidence of valvular disease. There have been other similar reports and it may be concluded that massive salicylate therapy is too dangerous to be justifiable.

When sodium salicylate is, used in the ordinary way fewer toxic symptoms are encountered if large doses of ascorbic acid (200 milligrammes daily) are given at the same time. A new drug, calcium succinate (administered as a double salt of benzoic acid and succinic acid benzyl ester four to five grammes daily), has recently given better results than sodium salicylate. For example, Gubner and Szucs found electrocardiographic abnormalities in 55% of patients treated with salicylate and only in 9% of those treated with succinate.

Infantile Diarrhoea and Vomiting.

The pathological state which for want of a better name is called gastro-enteritis now heads the list of killing diseases of infancy. In spite of all precautions, outbreaks occur from time to time in maternity hospitals in different parts of the world, in the babies' wards of children's hospitals and in other institutions. These attacks have in common extreme infectivity, a high mortality rate, especially among weakly infants, and the relative insusceptibility of older children and adults.

It is recognized that a number of different infective agents can produce a similar clinical picture. A bad outbreak in the Brisbane Women's Hospital in the early part of 1943 was due to a paratyphoid B infection; and the present severe epidemic among infants in the Brisbane area has produced an unidentified salmonella. The *Staphylococcus aureus* has been blamed for other incidents, and yet others have been attributed to parenteral infection.

But there are still mysterious epidemics, such as one reported recently from Philadelphia, for which no cause can be found. This outbreak affected 63 infants in a maternity hospital, 15 of whom died. Attempts at cultures from stools, noses and throats of patients and nurses revealed no recognized pathogens; autopsies showed non-specific entero-colitis, and chemotherapy was useless. The epidemic was controlled only by closing and cleaning the entire department. In such circumstances one must consider whether a virus may not be responsible. It is interesting, therefore, to read the work of Buddingh and Dodd, who claim to have found a virus causing outbreaks of neonatal diarrhoea and stomatitis with or without diarrhoea in older children. Adults also develop the stomatitis and become asymptomatic carriers of the virus. The post-mortem changes in their cases were mostly in the small intestine, and consisted chiefly of hyperaemia of the mucosa with pin-point haemorrhages. The virus was recovered from mouth swabs and stools by inoculating the scarified cornea of young rabbits. In twenty-four to forty-eight hours the animals exhibited corneal opacity, conjunctivitis and iritis. Specific neutralizing antibodies were produced by the rabbit and could be demonstrated also in the serum of convalescent infants.

As a therapeutic measure sulphaguanidine has proved useless except for bacillary dysentery, which is not a common type of infantile diarrhoea, nor has phthalylsulphathiazole proved very efficacious in the recent Brisbane epidemic. Reliance must still be placed on the immediate stopping of milk feeding, only water, glucose and electrolytes being given by mouth. In all severe cases an intravenous drip administration of fluid should be started early to ensure hydration. This can run indefinitely at a rate not exceeding three millilitres per pound of body weight per hour. Frequent blood and serum transfusions, in amounts of ten millilitres per pound of body weight, seem to have been of value, perhaps by maintaining protein intake, perhaps by supplying antibody.

Concerning electrolytes, there is some interesting new work from Yale, where Darrow investigated infants with severe dehydration due to diarrhoea, and found that the composition of intracellular as well as extracellular fluid was disturbed. As a result there was a loss of intracellular potassium, amounting in some cases to as much as one-quarter of the estimated normal potassium content of the baby. Parenteral supplements of fluid with one to two grammes of potassium chloride a day gave adequate replacement. In another paper Govan and Darrow compare their results in two series of cases of diarrhoea of comparable severity. A group of 53 infants received the usual treatment, and of these 17 died; 50 other infants received similar treatment plus the administration of potassium chloride, and of these only three died. The authors conclude that, although the decrease in mortality is not accompanied by a shortening of the illness or a decrease in the intensity of the diarrhoea, the administration of potassium chloride in conjunction with other established procedures enables the babies to withstand severe or prolonged attacks which would otherwise be fatal.

Nutrition.

There is much progress still to be made in the field of nutrition, but it has to be accomplished not by biochemists and research teams, whose work is well advanced, but by medical practitioners, hospital boards, heads of institutions and the like. We still need to insist that, if they are to be healthy, children must be fed adequate amounts of the "protective" foods—meat, eggs, milk, butter, cheese, wholemeal bread, fruit and vegetables.

Yet this is what happens. I saw recently a girl who complained of being always tired. She was tall, thin, underweight and anemic; her muscles were soft and her posture was poor. This child of nine was a boarder at a secondary school. Her breakfast consisted of porridge, white bread and butter and tea. Dinner was an ordinary affair of meat, vegetables and pudding. The evening meal was again white bread and butter and tea. This child had one serving of meat daily, no eggs, no cheese, no fresh fruit and less than a quarter of a pint of milk.

We should not consider the provision of adequate food to be a luxury; yet it is so regarded in most institutions. For example, the Department of Home Economics in Chicago investigated 151 children in an orphanage. During a two-months observation period the children averaged only 61% of the expected gain in height and weight. Their diet was then supplemented for a year with the "protective" foods listed above, not in excess but in amounts sufficient to bring the intake of the various food factors up to the level recommended by the National Research Council. The result was immediate; during that year and for two months thereafter the weight and height increase was 140% of the expected gain.

Observe that it is whole food, not merely vitamin supplements, that is required. A parallel English investigation covered 1620 children attending primary schools. They were divided into two equal groups and for twelve months one group was given a placebo capsule, the others a vitamin capsule. The latter contained 4000 units of vitamin A, one milligramme of thiamin, two milligrammes of riboflavin, 20 milligrammes of nicotinamide, 50 milligrammes of ascorbic acid, 600 units of vitamin D. In spite of this comprehensive supplement no consistent effects were noted on growth, strength, endurance or hearing, or on various physical states, such as posture, mouth breathing or general appearance.

The provision of water, glucose and various electrolytes by the intravenous route to the child who is vomiting or unable to swallow is now a commonplace hospital practice, but we are still some way from being able to supply all the nutritional needs of the patient by the same route. Solutions of amino acids prepared by protein hydrolysis are gradually becoming available, and when these can be given in quantity without risk of reaction it will be a big step forward. Unfortunately, as Gamble has pointed out, unless the energy requirement is completely covered, the greater part of any protein provided parenterally in the form of hydrolysates is oxidized for energy. It is just possible, but very difficult, to provide a full caloric intake with 10% glucose solution given intravenously. We really need to provide fat parenterally in a suitable form. Experiments are now being conducted along these lines and the intravenous administration of emulsified coconut oil to dogs has already been successfully achieved.

Post-Rubella Defects.

The connexion between maternal rubella in early pregnancy and congenital malformations in the infant was first described in 1941 by Gregg, of Sydney, and by Swan, Tostevin and others of Adelaide. Confirmation followed from other parts of the world. Incredulous physicians were soon asking whether the disease was truly rubella or a new but similar virus; for it is hard to understand, without postulating some variation in the virus, how such striking effects could have remained undiscovered for so long.

There is now enough evidence to silence those who claimed the association to be just coincidence. To take but a few examples, Swan and Tostevin have collected 400 instances of congenital defects in which the diagnosis of maternal rubella in the first trimester of pregnancy has been established beyond doubt.

Here in Queensland Winterbotham has reported a sudden recent increase in the admissions to the Brisbane Deaf and Blind School. The children concerned were conceived in 1938, during a rubella epidemic. The mothers of 34 of the 48 pupils in that age group gave a history of rubella during their pregnancy.

A recent survey in the United States of America covers 136 children with congenital abnormalities whose mothers sustained some virus infection during pregnancy. All but two of the mothers had had rubella; the others had had mumps and influenza. Of the infants, 80% had cataracts, 62% were mentally deficient, 57% had cardiac lesions. Deaf-mutism and other defects were less common.

There is some evidence to show that the type of abnormality in the fetus is determined to some extent by the exact stage of embryonic development at which the maternal disease occurs; for example, cataract at the sixth

week, deafness at the ninth week. However, in all series cataract seems to be the commonest defect.

We cannot tell what proportion of women who incur rubella in early pregnancy will bear normal infants, because investigation perforce starts with the deformed babies and works backwards. A recent Boston review of combined work from American and Australian sources puts the risk of fetal defects at "upwards of 25%", but other authorities in the United States of America conclude that 100% of mothers who contract rubella during the first two months of pregnancy and 50% of those who contract it during the third month will give birth to damaged infants, and this is broadly the Australian opinion. If these figures are accepted, termination of pregnancy under such circumstances is certainly indicated. Rubella is a mild disease, except in its effect on the embryo, and therefore deliberate infection of all girls with rubella virus before marriage may not be too fantastic a suggestion.

RISKS OF SURGERY IN THE AGED.¹

By J. W. S. LAIDLEY,
Sydney.

For some years now the statisticians have warned us that we are a senescent race. Preventive medicine and the recent triumphs of curative medicine and surgery have resulted in our population's containing an ever-increasing number of elderly people, among which group surgical emergencies frequently occur and carry many special risks which are not apparent in the young.

Far more obvious to most of us here tonight than the gradual senescence of our population is the rapid senescence of our motor-cars, and it may make conditions clearer to most of you, who, as I do, own a senescent motor-car, to remark that incredible and unpredictable accidents can happen to worn-out machinery.

The mishaps associated with surgery in the aged are often similarly incredible and unpredictable.

It is rare that all the systems of the human body age at an even rate. The official cause of death upon the death certificate is seldom simply "senility". More often the cause of death is directly due to the failure of one particular system to function further.

The old saying that a man is as old as his arteries is correct, but it could well be amplified to include his kidneys, his hæmopoietic system and other organs.

Probably the greatest difficulty for the surgeon lies in the correct assessment of an old man's chances of weathering some surgical interference, and in this one is guided by past experience, by the experience of others, and ultimately by instinct.

For instance, countrymen (real countrymen, I mean, not people who live in country towns), clergymen and schoolmasters seem to be on the whole very good surgical "risks". On the other hand, it is uncommon for an hotel-keeper to live to require a prostatectomy, and I can never remember having to operate upon a bartender. Businessmen of the ascetic type are good "risks", but the stout, hypertensive, hard-working, "successful" businessman is one of the worst.

In general, the man who has adopted a life of moderation, especially in the pleasures of the table, and who has continued to take a reasonable amount of physical exercise after middle age can be expected to withstand the hazards of surgery far better than the sedentary worker with an unrestrained appetite.

Serenity of mind is another important factor, and it is here, I think, that the clergyman particularly scores. Solicitors, accountants and sea captains are notoriously bad patients in this respect. It has never been their habit to delegate authority to anyone, and there is usually a

¹ Read at a meeting of the New South Wales Branch of the British Medical Association on December 11, 1947.

strong clash of personalities during convalescence between the surgeon and themselves.

Finally, as this is a doctors' audience, a word about doctors themselves. In my experience doctors are excellent patients, both confident and uncomplaining.

Complications.

I would like now to pass on to relate to you a few of the more obvious complications which can occur in the surgery of the aged.

Acute Cerebral Degeneration.

Acute cerebral degeneration is not infrequent and sometimes is wholly unexpected. Sometimes it is obvious before operation that an individual is on the mental down-grade and one can plan accordingly. But occasionally out of a blue sky a patient will become completely mentally incoordinated on the first or second day of his convalescence. If the patient does not respond to sedation the outcome is usually fatal, as he exhausts himself in his muscular efforts, tears off his dressings and plucks out his tubes.

In cases such as this I regard the outlook as extremely grave unless he can be completely and continuously nursed by special nurses. Those with minor grades of disorder usually recover, but are very worrying to the relatives, who fear that the confused mental condition may be permanent. This is seldom the case, however, as the mind usually clears by the third week after operation.

Cardio-Vascular Disease.

In the cardio-vascular system complications are legion. One problem constantly cropping up is the question of added risk at operation when there is a previous history of coronary occlusion.

In most instances when surgery is really necessary (as it always should be in the aged), this history must be ignored and the patient should proceed with his operation without modification of the programme.

I can remember a patient on one occasion who, while undergoing transurethral resection of the prostate under low spinal anaesthesia, had an occlusion during the course of the operation. On many occasions, in common with most surgeons, I have seen death during convalescence from coronary occlusion.

The other common cause of sudden death during convalescence is, of course, pulmonary thrombosis—but here I have no evidence that it is more common in the aged than in the patient of middle age.

Excessive hypertension is a worrying complication in prostatic disease. The high blood pressure is undoubtedly the cause of post-operative secondary hæmorrhage, which occurs more often than in the patient with normal blood pressure.

Furthermore, after such a hæmorrhage, the blood pressure may fall to figures which are below those necessary for glomerular filtration and uræmia may supervene.

I am not fond of spinal anaesthesia for the patient with either very low blood pressure or very high blood pressure, as an undue fall in blood pressure in either case may be extremely serious for the patient.

It has fallen to my lot on a number of occasions to relieve retention of urine due to enlarged prostate in patients who have at some time previously suffered a cerebral hæmorrhage and cerebral thrombosis. In problems of this type I am particularly glad to have all the help the anaesthetist can give me, in order that during the course of the operation and afterwards the blood pressure shall remain at as constant a level as possible.

Senile Glycosuria.

Senile glycosuria can be a major complication at times, and here again sometimes we are warned by the presence of sugar in the urine before operation; but sometimes there is a concealed trap when a patient previously quite normal suddenly shows large quantities of sugar and acetone in the urine shortly after operation.

I remember one patient at least who had undergone a suprapubic prostatectomy, and who would have died,

presumably of uræmia, had it not been for an astute resident who recognized the acetone breath and instituted the appropriate treatment.

Uræmia.

Uræmia is another complication of surgery in the aged, especially when the operation of prostatectomy has been performed. Those of you who are not specially associated with urinary surgery are probably of the opinion that uræmia is a common terminal event. Actually, uncomplicated uræmia is rather rare and is not to be anticipated when the pre-operative renal function is adequate and when active nephritis is not present.

More often uræmia occurs as a terminal feature of post-operative pyelonephritis or when there is a generalized cardio-vascular break-up. When it is complicated in this manner all remedial measures will be unavailing and the patient will drift more and more deeply into coma until death supervenes.

Chest Complications.

Of the chest complications in the aged, pneumonia is, of course, outstanding, and it is well to differentiate between genuine lobar pneumonia or bronchopneumonia and the hypostatic pneumonia which is the terminal event of cardiac failure or over-enthusiastic intravenous fluid injection. The first, of course, in most instances respond to antibiotics; hypostatic pneumonia is uniformly fatal.

I am reminded of one patient, who, having become ambulatory once more after prostatectomy, slipped on the tiled floor of the hospital bathroom, fractured his femur and died of pneumonia a week or two later.

Senile Arthritis.

Senile arthritis can be a most worrying complication for the surgeon and can cause excessive pain to the patient.

I remember an old countryman developing an excruciatingly painful hip joint during convalescence. The pain persisted for long after his surgical convalescence was complete, and the problem of relieving the pain to within the limit of tolerance proved almost insuperable to a medical colleague and myself.

Anæmia.

Before leaving this very incomplete catalogue of complications I would like to bring the matter of anæmia before you, because it is insidious and, if not recognized, often fatal.

The hæmopoietic system of an old man will not respond indefinitely to the normal stimulus, and often it is found during a convalescence complicated by some infective incident that the patient does not respond as he should to the antibiotics administered to him.

At this stage a blood count will frequently reveal that the patient's hæmoglobin store is grossly depleted and a blood transfusion will place him on the high road to recovery in a few days.

Discussion.

Instances of this kind could be multiplied almost *ad infinitum*. A breakdown may occur in any system of the human body with no warning signals. Much can be done to anticipate such catastrophes by a careful clinical examination and by the help of the pathologist and biochemist. On many occasions, however, all these will fail and a concealed trap is sprung without warning.

For my own part, I am extremely happy if I have the opportunity of seeing the patient while he is still ambulatory and before he enters hospital—in fact I regard it as a definite clinical deprivation if I cannot do so.

Information is available at once about his appearance, muscular activity and outlook on life, all of which, when added to the consideration of the pathological condition for which he consults you, will enable you to come to the best decision possible for the patient's welfare. This decision can be covered shortly by answering the following questions: (i) Should an operation be performed? (ii) What type of operation should be performed?

Old people as a rule are not interested in operative risk, but are interested in the prospects of relief from pain or disability.

The man in his middle fifties who requires prostatectomy is still mentally creative, his life plan has not matured, and he displays anxiety as to his prospects of survival.

Twenty years later the life plan is as a rule complete and the individual of seventy-five years has only one concern—namely, his comfort.

I would like to round off this address with some personal observations upon the operation itself.

First of all, and very diffidently, a few words about the anaesthetic. We have travelled a long road fairly rapidly since ether was poured from a drop-bottle onto a mask by someone who had seen the patient, as a rule, for the first time about five minutes before he uncorked the ether bottle.

We have had both the multiplication of anaesthetic agents and the development of anaesthesia as a true specialty in which a skilled colleague has prior consultation with the surgeon on the nature of operation and the surgeon's assessment of the patient; then he sees the patient, makes his own assessment, orders premedication and selects the most suitable type of anaesthesia; he administers that anaesthetic and finally is prepared to undertake any administration of gases or intravenous infusion of saline solution or blood which may be necessary in the immediate post-operative period. In short, the specialist anaesthetist today is able to turn on a complete and adequate service to surgeon and patient.

From my point of view, as one who is constantly performing the operation of prostatectomy, spinal anaesthesia was a great advance on ether, but even in the most skilled hands there were certain disadvantages which could not be entirely eliminated. These included fall in blood pressure, partial or complete failure of anaesthesia, post-anaesthetic headache and painful back.

The advent of "Sodium Pentothal" was again a step forward, and today, for my purposes, "Sodium Pentothal" preceded by intelligent premedication and aided at the right time by an injection of curare, produces a nearly ideal form of anaesthesia for surgeon and patient alike.

One has only to see a patient the morning following operation, sitting up in bed, eating bacon and eggs for breakfast, and without recollection of having left his bed for the operating theatre, to realize that one is viewing a latter-day miracle.

The surgeon as well as the anaesthetist can help enormously in dealing with the aged. The two points of outstanding importance are the gentle handling of tissues and the length of time on the operating table.

Deft, gentle surgery will save a patient much post-operative shock, and it is my opinion that any operation should be planned to be completed within thirty minutes, if it is possible to do so. It is most obvious that every five minutes taken by the surgeon over half an hour is greatly to the detriment of the patient.

Summary.

In this short address I have tried to bring before you the following considerations, which, more than in any other type of surgery, concern the surgery of the aged.

1. In the surgery of the aged the element of risk is high and cannot be greatly reduced if one is anxious to do the best for one's patient and if one is willing to operate where there is some doubt of survival.

2. Some post-operative complications may be foreseen, and in part provided for, but many cannot be anticipated.

3. Some post-operative complications which can be foreseen must be ignored by the surgeon when operation is necessary.

4. Every advance in anaesthesia makes surgery in the aged safer.

5. The surgeon must employ all his wits before he makes up his mind that surgery will really benefit his patient; and once that decision is made he must plan to inflict as little surgical trauma as possible.

RISKS ASSOCIATED WITH ANÆSTHESIA OF THE AGED.¹

By P. L. JOHNSON,
Sydney.

In considering the title of this paper I feel that the word "risk" is rather an unhappy one to use in connexion with surgery or anaesthesia, because it seems to imply leaving to chance the outcome of something that could be guarded against, and I think that although no man can be known so thoroughly that his every response can be foreseen, nevertheless, with careful examination and preparation of a patient, we should seldom be caught quite unprepared.

And so tonight I think the purpose of this paper can best be served by my trying to run over, as well as I can in the time allowed, the basic changes of old age in health and disease, and the best methods, within the scope of the anaesthetist, of preventing harm from coming to the patient.

Anatomical, Physiological and Pathological Changes.

The anatomical, physiological and pathological changes in old age are those of decreased activity and decreased elasticity of structures due to an increase in the amount of interstitial fibrous tissue. The basal metabolic rate is reduced; this is better expressed by saying that there is a retardation of the tissue oxidation rate, a fundamental fact of importance to the anaesthetist, whose business it is to manufacture a properly respirable atmosphere for the patient during and sometimes after operation.

There is an increase in the interstitial fibrous tissue of the myocardium, arteries and arterioles, with atheromatous changes in the intima of the vessels.

In the respiratory system there is limitation of vital capacity due to kyphosis, rigidity of the costal cartilages and diminished elasticity of lung tissue, and very often inflammatory processes of long standing are present at the lung bases.

Emphysema and inflammatory exudate, if present, reduce the oxygen transfer to the blood. Relative weakness of diaphragm and abdominal muscles reduces the respiratory vigour still more.

In general there is decreased speed, strength and endurance of the neuromuscular mechanism.

There are some pathological changes which occur most commonly in old age, such as those due to deficiencies in protein and vitamin intake. Very often in the aged, owing to some disease, lack of interest, or poverty, the protein intake is low; this does not often lead to frank signs of hypoproteinaemia, such as oedema or reduced serum protein level, because this is well maintained at the expense of tissue proteins, but there will often be a dangerously low protein reserve lurking behind an apparently normal serum protein level in old people. Vitamin deficiency can also occur, and there may be little to show for it. Anaemia is often found, associated with achlorhydria, poor food and iron intake and occult blood loss.

Tolerance to Drugs, Anaesthetic Agents and Shock.

The effects of old age in tolerance to drugs, anaesthetic agents and shock are seen to follow closely the downward trend of the basal metabolic rate as age progresses.

The effects of the sedative drugs, morphine especially, are great in old age; dosage should be reduced in proportion and then a little more. Apparent body volume is often deceptive; the big man who has lost weight when old very often still appears big, but he has a relatively small amount of functioning soft tissue hung upon a large but pharmacologically inactive skeleton.

Renal excretion is often slow, and absorption from the gastro-intestinal tract and from the subcutaneous tissues may be slow. Apart from the fact that the direct sedative

¹Read at a meeting of the New South Wales Branch of the British Medical Association on December 11, 1947.

action is sometimes greater than expected, care is necessary in sedation of the aged to avoid prolonged immobility and its ever-present dangers of extension of pulmonary disease, and circulatory slowing, which favour tissue anoxia, especially of the heart and central nervous system, and intravascular thrombosis.

Similarly the over-energetic use of pressor drugs can lead to vascular catastrophes.

Sulphonamides appear to be tolerated well in old age, but cyanosis should be avoided.

Liver action may be slow, not so much owing to age, probably, as to depletion of protein and glycogen store, so that those drugs detoxicated by the liver, such as "Avertin" and some barbiturates, may be dealt with more slowly, and there is a possibility of cumulative effect.

Anæsthetic agents are tolerated well. Ether, apart from its characteristic of causing increased secretion in the respiratory tract, is a good anæsthetic. It has been found that it takes a smaller amount per body weight of all anæsthetics to cause respiratory arrest in old animals, and experience shows that old people do not recover so easily or quickly from anæsthetic overdose as do young people.

Shock is of graver significance in the aged, owing to the danger that slowing of blood flow may cause vascular accidents; also the old person, with his diminished tissue fluids, is less able to compensate for reduction in circulating blood volume and his peripheral vasomotor system is less energetic in its regulation of blood pressure.

The use of fluids given intravenously must be watched more carefully because there is less ability to regulate blood volume, but, at the same time, fluids must be given intravenously when indicated, and are of the greatest importance.

An increase in blood viscosity is, as we can see, a dangerous state.

Anæsthetic Methods in Old Age.

At this point I think it is appropriate to mention briefly the subject of anæsthesia in the presence of heart disease.

By old people with heart disease I mean, firstly, those showing evidence of mechanical impairment of heart muscle, conducting mechanism or valves, evidenced by irregularity of rhythm, changes in the electrocardiogram, and cardiac murmurs. Secondly, there are the group of patients who have a raised venous pressure of cardiac origin.

Anæsthetics in themselves do not do much harm to the diseased or healthy heart. Mismanagement during or soon after anæsthesia most certainly can.

In the first group mentioned the problem hinges mainly on maintaining the rate and quality of the coronary blood flow with as little change as possible. The danger to the heart is that of coronary thrombosis and direct damage to the heart muscle. In shock there are the dual factors of low arterial blood pressure and rapid beating—the oxygen consumption of the muscle rises and the supply falls.

In the young heart a moderate degree of cyanosis may cause a fourfold increase in coronary flow; in the aged heart this increase may not be possible, so that a little oxygen lack may cause much myocardial anoxia.

The second group, with raised venous pressure, flies two danger signals. The heart muscle has reached a state where a venous pressure higher than normal is necessary to elongate its fibres for each beat. It must be near its limit.

Also the raised venous pressure is transmitted along the vessels whence it came, to lungs and splanchnic area particularly, so that in the lungs we have exudation of fluid into the alveoli reducing oxygen absorption, and dilatation of vessels occluding some alveoli and reducing vital capacity. In the splanchnic area the enlarged liver pushes up the diaphragm, and there may be ascites. There is usually a raised intraabdominal pressure, further diminishing vital capacity and hindering respiratory movements.

In people with this condition, apart from the obvious dangers of anoxia, resistance to inspiration will easily cause pulmonary œdema.

For the first group, without venous congestion, anæsthesia carries no very great hazard, provided the condition of the myocardium is constantly borne in mind by the anæsthetist.

With constant care and awareness of its potentialities for accidents, anæsthesia in the aged is relatively easy.

Mentally, most old people are placid and tolerant of manipulations and methods. They rarely show the excited apprehension that we sometimes see in the young. This quietness of mental outlook makes them ideal subjects for local or spinal anæsthesia, but with the use of local anæsthesia as little sedative premedication as possible should be given.

I am no advocate of local anæsthesia given to a patient under a general anæsthetic of morphine and scopolamine.

Spinal anæsthesia is very good and is well tolerated, but high spinal anæsthetics carry a very great danger of hypotension and are, I think, seldom applicable to the aged, unless the cardio-vascular system is well able to control any fall in blood pressure, assisted if necessary by restorative measures.

In the larger intraabdominal operations, such as abdomino-perineal resection of the rectum, gastrectomy, hysterectomy *et cetera*, spinal and general anæsthesia can well be combined; the spinal anæsthesia can be brought high enough to give abdominal relaxation, but the general anæsthesia makes it unnecessary to have the spinal so high as to give complete anæsthesia all over the abdomen. Thus hypotension due to the spinal anæsthesia is minimized.

Intravenous barbiturate anæsthesia is very useful in old people. "Pentothal Sodium" or one of its equivalents is usually used and has been found to be very successful for many lower abdominal operations in which relaxation is more easily obtained, and of which the duration is limited. These are such operations as prostatectomy, suprapubic cystotomy and sometimes nephrectomy. It is also very useful in orthopædic operations, uro-genital endoscopy, and other short procedures requiring only moderate relaxation.

There are dangers in trying to produce complete muscular relaxation with the barbiturates—the amount necessary is so large that severe respiratory depression and prolonged post-operative sleep are the rule—things to be avoided at any age, but especially in old people.

Intravenous anæsthesia for biopsies or radium needling in the mouth must not be taken lightly. Inhaled foreign material will cause lung abscesses at any age, and laryngeal spasm under "Pentothal" anæsthesia in old people is a fearsome thing. However, old people are usually edentulous and their jaw muscles relax easily, so it is not a difficult matter to insert an endotracheal tube and pack off the larynx. The peace of mind so gained, to say nothing of the safety of the patient, is well worth it.

Cyclopropane is almost an ideal anæsthetic for the aged; with their weaker muscles relaxation is usually adequate, induction and recovery are quick, oxygen percentage may be kept high, and there is no irritation or mucus secretion in the respiratory tract. Induction with a small amount of "Pentothal" and continuation with cyclopropane make a very pleasant and quiet anæsthetic, with quick recovery.

The combination of curare with "Pentothal" or cyclopropane is very successful, but, because of their small respiratory reserve, more than usual care must be exercised with old people to see that there is no weakness of the respiratory muscles remaining before the patient is returned to the ward.

Ether, carefully given and with a high percentage of oxygen if necessary, is a good anæsthetic at any age and is well tolerated in old age. Care must be taken to avoid salivation and mucus secretion, and for this atropine is essential. However, in control of mucus secretion, atropine should be used to prevent it, never to attempt to dry it up once it has appeared, because then the result is a persistent gluey mucus that cannot be easily expelled. Suction, if necessary down the trachea, is the best way to remove secretions.

The maintenance of blood pressure is carried out, as at any age, by the intravenous administration of fluids, of

blood or serum or both, and by pressor drugs. I say "maintenance" advisedly, because the aim should be to prevent a fall in blood pressure rather than to retrieve it once it has fallen. In the aged this is even more difficult to do than in younger people, and a period of hypotension carries with it more danger in old age.

Therefore, if shock is expected, as in an extensive operation, blood should be infused from the beginning.

Of the pressor drugs, ephedrine should be used intramuscularly at the very first sign of a fall in blood pressure, and prophylactically in spinal anaesthesia above the level of the twelfth thoracic segment.

Ephedrine should not be given before the spinal anaesthetic is actually injected, as a dangerous rise in blood pressure may occur if it is subsequently found impossible to get a lumbar puncture needle into an osteoarthritic spine.

In the presence of frank hypotension the effect of "Neo-Synephrin" given intravenously is dramatic. One minim will often raise the systolic pressure 70 to 100 millimetres of mercury. It is a potent drug and should be given in doses of not more than one minim at a time and the effect assessed before it is repeated.

Whatever method of anaesthesia is used, special care in the old should be taken to aspirate mucus from the pharynx, and from the trachea if necessary, at the end of the procedure. This applies whether an endotracheal tube has been used or not.

Some Mishaps and other Illustrative Cases.

Curare in old people may cause very profound relaxation and respiratory depression. Recently a patient was given 10 milligrammes of curare and "Pentothal" for a hysterectomy. When she was tipped into a rather steep Trendelenburg position there was complete respiratory arrest, and it was almost impossible to inflate the lungs by manual compression of the bag. The combination of the weight of the viscera on a paralysed diaphragm with a rigid chest wall was almost too much. An endotracheal tube was passed, the steepness of the position lessened, and she caused no further worry.

Last year I saw an old man brought back to the theatre to have a cystotomy wound reopened to evacuate blood clot. He was frail and exsanguinated. An injection of 0.15 gramme of "Pentothal" was sufficient anaesthesia for the operation and he slept afterwards for twenty-four hours.

Incidentally, on the subject of "Pentothal", it is often recommended that it is better used in 2.5% solution for susceptible subjects. It is my own preference to stick to the strength of solution I am used to, as I think one can assess dose and effect better than with an unfamiliar strength of solution. If one is used to using 2.5% solution this does not apply of course.

An old woman required to have a Smith-Petersen nail inserted. She was a chronic alcoholic and had a cirrhotic liver palpable about a hand's breadth below her costal margin. Anaesthesia was begun with cyclopropane and continued uneventfully for two hours with a mixture of 30% oxygen and nitrous oxide. Premedication was with "Omnopon" (one-sixth of a grain) and scopolamine (one three-hundredth of a grain) given one hour before.

Many old men spend a lot of time out of doors and their skin is pigmented with age and sunburn. I remember one healthy-looking old specimen who on closer examination was very anæmic—his blood hæmoglobin value was 30% of normal when estimated. "Pentothal" would probably have killed him with respiratory depression on top of insufficient oxygen carrying power of his blood.

An old man was brought in with intestinal obstruction and was given one-third of a grain of "Omnopon" and one one-hundred-and-fiftieth of a grain of scopolamine as premedication. Then he was given some "Pentothal" ("about 10 c.c.") and the intention was to carry on with cyclopropane. It was not required.

Some months ago I saw one minim of "Neo-Synephrin" given intravenously to a patient under anaesthesia with a systolic blood pressure of 70 millimetres of mercury; the pressure went up to 140 millimetres. I was also told about a patient who was given one-half millilitre of "Neo-

Synephrin" intramuscularly and another half millilitre intravenously. When the circulation improved the full effect of one millilitre was exerted and the systolic pressure rose to 300 millimetres of mercury. I do not know what happened after that.

Be careful of patients' eyes during anaesthesia. It is bad enough to cause abrasion of a cornea at any age, but in old people there is usually infection of the lachrymal sac and a corneal abrasion is very easily infected; the resulting ulcer is very slow to heal.

An old patient thought her heart was bad and she persuaded the surgeon to have an electrocardiogram prepared. The cardiologist reported "coronary sclerosis", so a physician was called in to determine the patient's fitness for anaesthesia. He wrote "Fit for Gas" on the consultation sheet, but omitted to specify whether he meant nitrous oxide, cyclopropane or coal gas. The point about all that is that an anaesthetist is usually able to assess a patient's fitness for anaesthesia, and also it brings up the subject of electrocardiograms. As an isolated investigation I think the electrocardiogram is of doubtful use. Even if a definite lesion is indicated, an examination of the patient and his history may show that he has no venous congestion and good exercise tolerance. Conversely, an electrocardiogram may have little to show in the case of a patient whose heart is obviously in bad shape.

The essential, of course, is to examine the patient, not the electrocardiogram—let it add its weight, but not make the diagnosis.

Conclusion.

In the paper tonight I have endeavoured to adhere to the basic physiology and pathology of changes leading to danger to the patient during anaesthesia in the aged. Provided we bear the basic principles in mind, we should not often be caught unprepared.

You may have noticed that I made no reference to age in years when considering old people. A man is as old as his tissues, not his years, and many a man of seventy years is no older in his tissues than some people of fifty years. Like the electrocardiogram, chronological age helps in assessment of a patient, it does not make the assessment.

However, beware of the strong and hearty old man or woman. The years behind them may have made a chink in their armour, to make them vulnerable under the stress of operation.

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Reviews.

"CLINICAL PSYCHOLOGY."

THE purpose of "Training in Clinical Psychology" is to report the results of a conference attended by psychiatrists, psychologists and social workers to discuss the problem of the clinical psychologist.¹

This conference was arranged by the Josiah Macy, Junior, Foundation, in the belief that the sponsoring of informal discussions between workers in the different branches of

¹ "Training in Clinical Psychology"; Chairman Dr. Lawrence S. Kubie; Editor, Dr. Molly R. Harrower; 1947. New York: Josiah Macy, Junior, Foundation. 9" x 6", pp. 88. Price: \$1.50.

1 "New Ways of Treating Uræmia: The Artificial Kidney, Peritoneal Lavage, Intestinal Lavage", by W. J. Kolff, M.D., with the cooperation of J. Van Noordwijk, P. S. M. Kop, N. K. M. De Leeuw and A. M. Joekes; 1947. London: J. and A. Churchill, Limited. 9½" x 6½", pp. 112, with many illustrations. Price: 10s. 6d.

excretory products in metabolism. It is not surprising to learn that patients who are forced to eat 200 grammes of sugar and 200 grammes of butter a day develop repugnance to their treatment, but there are actually some good grounds for the principle of bringing the ingested protein to a minimum in uræmic patients.

In regard to the artificial kidney, attempts have been made in many physiological laboratories either for teaching or research, to make a large model glomerulus. The American Abel coined the term "vividiffusion" for such techniques. The apparatus described here is one such. A considerable difficulty in the past has been the choice of membrane; Kolff has found "Cellophane" to be highly practical. Another difficulty has been clotting of the blood; Kolff gives his patients heparin. A "Cellophane" tube is wound like a spiral round a relatively large cylinder; the blood in the "Cellophane" tube tends to sink by gravity and accumulates in the region of the dialysing Locke solution which lies outside. By an ingenious device the cylinder rotates on its long axis. There are other adjuncts such as a blood pump and a bubble and clot catcher. The total area of membrane is about 24,000 square centimetres, approximately the same as the total glomerular surface. The minute volume, that is, the quantity of fluid passing through the artificial kidney per minute, is from 100 to 200 millilitres, about one-tenth that in the human kidney. The dialysing tube can be sterilized before use and kept sterilized during use. Certain dangers, such as pyrogenic substances getting into the "rinsing fluid", are mentioned and an appropriate warning is given. The artificial kidney is recommended if the blood urea content has risen to 3.5 grammes per litre or if the alkali reserve is lowered or the potassium concentration raised. A perusal of the description of the apparatus and of the records of cases in which it has been used gives us the belief that the device is a desperate remedy for a desperate uræmic emergency. The author candidly announces his failures and presents the reader with what he naively terms "a gloomy table" showing factors which caused death. One physiological flaw in the principle should be pointed out. Blood contains protein exerting an osmotic pressure of about thirty millimetres of mercury; the dialysing fluid has no protein or other colloid to balance the blood protein, and hence the direction of diffusion will be mainly into the blood and not out. It is probably to make up for this in part that Kolff raises the glucose concentration of the dialysing fluid to as much as 2%; but this cannot take the part of protein.

DUST AND ITS EFFECTS ON THE RESPIRATORY SYSTEM.

The publishing firm of H. K. Lewis and Company has a good reputation in the medical profession for the quality of the works it issues, and so one is all the more surprised to find it sponsoring a booklet on the effects of dust on the respiratory system which is far below the standard we expect.¹ The author, George H. Gill, is an engineer, but that has not deterred him from attempting to give an exposition of the pathological changes in the lungs arising from the inhalation of various dusts. Of the four authorities he cites as references regarding lung structure and function we find the "Pocket Medical Dictionary" by Oakes and Davie and "Human Physiology" by Furneaux and Smart. For the fibrotic changes in the lungs consequent upon inhalation of siliceous dust he puts forward purely physical and chemical explanations. It will hardly be credited that there is not a single mention of the tubercle bacillus or of any other bacterial infection, and, of course, the adjuvant action of silicates in fostering the *Bacillus tuberculosis* is omitted. One of the chief authorities mentioned in connexion with asbestosis is the American Lanza, who would be the first to admit that his views were founded chiefly on investigations made in Yorkshire, England; but these are ignored. In regard to the dust in cities the pioneer work of J. B. Cohen, of Leeds, receives no mention. It is surprising to learn that a method of treating silicosis by inhalation of aluminium powder has been patented. Apart from the questionable ethics of this procedure, there is a veritable danger that the pathological condition would be aggravated; indeed a warning to this effect was issued by the American Medical Association in April, 1946.

¹ "Dust and its Effects on the Respiratory System", by George H. Gill, A.M.I.Mech.E.; 1947. London: H. K. Lewis and Company, Limited. 8½" x 5½", pp. 50, with many illustrations. Price: 5s.

The only part of this book which could be useful to the specialist in industrial hygiene is that devoted to "testing technique" where a description will be found of the "Greenburg-Smith Impinger", the "Owens Jet Dust Counter", the Zeiss "Koniometer", the "Thermal Precipitator" and other instruments and methods. The rest of the book is worthless.

PENICILLIN THERAPY.

J. A. KOLMER has published a second edition of his book on penicillin therapy.¹ In this volume of 320 pages he discusses the most recent methods of treatment with penicillin, tyrothricin, streptomycin and other antibiotics. The book covers a wide field of therapeutics, and there can be little that is overlooked in the field dealt with. Kolmer gives a brief history of penicillin and of its manufacture; he discusses the different types of penicillin, F, G, X and K, and the various properties of the different types. He considers in detail all the diseases susceptible to treatment with penicillin, and gives a full account of those disorders which do not respond to treatment. There is not the same detail about streptomycin, and in view of the recent developments in its use, this is to be understood.

Notes on Books, Current Journals and New Appliances.

A NEW ABSTRACTING SERVICE.

FROM Holland there has been issued a publication known as *Excerpta Medica*. It consists of a series of fifteen journals each of which will be published once a month. These journals contain abstracts of articles and deal with the following subjects: Section I: Anatomy, anthropology, embryology and histology; Section II: physiology, biochemistry and pharmacology; Section III: endocrinology; Section IV: public health and social industrial medicine; Section V: general pathology, pathological anatomy and bacteriology; Section VI: internal medicine; Section VII: paediatrics; Section VIII: neurology and psychiatry; Section IX: surgery; Section X: obstetrics and gynaecology; Section XI: oto-rhino-laryngology; Section XII: ophthalmology; Section XIII: dermatology and venereology; Section XIV: radiology; Section XV: tuberculosis. In the brochure introducing these publications it is pointed out that the recent war swept away many of the organizations in continental Europe which tried to provide an abstracting service in the particular fields of world medical literature. The aim of the present service is to provide "pertinent and reliable abstracts in English of every article appearing in every available medical journal in the world".

This is an enormously ambitious project. In each section there is a board of editors comprising prominent members of the profession in different countries and the whole feature is under the general editorship of M. W. Woerdeman, Professor of Anatomy and Embryology in the University of Amsterdam (chairman), Professor A. P. H. A. de Kleyn, Professor of Oto-Rhino-Laryngology in the University of Amsterdam, and Professor W. P. C. Zeeman, Professor of Ophthalmology in the University of Amsterdam. The abstracts, we are told, are prepared by a staff of 3000 specialists all over the world and their activities are supervised by 400 editors, all of whom are said to be among the best known representatives of their specialty.

The cost of these publications is as follows (the sum quoted is presumably sterling currency): Sections I, IV and VIII, £5 12s. for a volume of approximately 900 pages; Section II, £11 3s. for two volumes yearly, each of approximately 900 pages; Sections III, VII, X, XI, XII, XIV and XV, £3 15s. per yearly volume of approximately 600 pages; Sections V and VI, £9 6s. per two volumes yearly, each of approximately 750 pages; Sections IX and XIII, £6 4s. per yearly volume of approximately 1000 pages. Messrs. E. and S. Livingstone, Limited, of Edinburgh, are the agents in Great Britain.

¹ "Penicillin Therapy, including Streptomycin, Tyrothricin and other Antibiotic Therapy," by John A. Kolmer, M.S., M.D., Dr.P.H., Sc.D., LL.D., L.H.D., F.A.C.P.; Second Edition: 1947. New York, London: D. Appleton-Century Company Incorporated. 9½" x 6½", pp. 364, with illustrations. Price: \$6.00.

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All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

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SPECIALISM AND ITS SAFEGUARDS.

MEDICAL EDUCATION and the training of surgeons have been discussed over and over again in every reputable medical journal. What is written about the training of surgeons may be applied in large measure to the training of recruits in any of the medical specialties. Specialism is increasing to such a great extent, particularly in the surgical sphere, that the observer may be pardoned if he wonders how much further the process of fission is likely to go. Nowadays those doctors who interest themselves in one aspect of medicine more than another like to be known as specialists in that branch of practice, and in some places those who would claim the status and privileges of specialists are required to be registered as such. There is something to be said for this kind of arrangement, but it is also beset with dangers and difficulties. The dangers are many and one or two only need be mentioned—first, there is the inadequate background on which an aspirant for specialist rank may make his application; there is a too ready acceptance of claims of proficiency; there is also a tendency to overemphasize technical skill, with an accompanying lack of appreciation of the other qualities that go to make a sound and reliable surgical specialist. In a recent presidential address on specialism in surgery¹ to the American Association for Thoracic Surgery, J. A. Bigger referred to the commonly held view that specialists are prone to suffer from progressive narrowing of their fields of vision. This, he said, was serious in any profession, but in medicine it might be fatal. With this we shall all agree. Bigger quotes Professor Geoffrey Jefferson's denial that specialization is necessarily limiting to the mind and general scientific culture of the individual, who, Jefferson insists, is still a physician and must remain one. The end result, of course, depends on the individual, on his training and on the mental outlook that he has acquired. Bigger states that the only satisfactory solution is to develop specialists, trained in basic sciences and with a broad view of clinical

medicine, yet proficient in the special techniques applicable to their particular fields. Bigger points out that a large proportion of the specialists who have done outstanding work as investigators, as teachers, and as clinicians, have been well grounded in one or more of the medical sciences or have been broadly trained in clinical medicine or surgery before restricting their work to special fields. He refers to Osler's statement that "the most dangerous members of the medical profession were those who were born into it, so to speak, as specialists". He holds that it is possible for hospital services in the specialties to be so conducted that practitioners trained on those services will retain a proper perspective toward the broad field of medicine and will appreciate the fundamental relationship between their specialty and medicine as a whole. This is no doubt true, and success in such circumstances will depend on the mental and other equipment of the staff.

If we wish to discuss the proper function of a surgeon or of a specialist in one of the branches of surgery, we shall do well to consider the scope of surgery, or as E. D. Churchill calls it,² the content of surgery. Churchill's views are expressed in an address entitled "Science and Humanism in Surgery", delivered before the American Surgical Association in March, 1947. He points out that though surgery is in large part a handicraft with elaborate techniques which may be grouped as technology, it transcends technology because of its inherent desire and responsibility to apply its techniques to the needs of humanity. This quality he designates humanism and includes as one of the basic contents of surgery. Science is another of the component parts of surgery, and surgery also contains "*ad hoc* hypotheses, or, in more frank terms, empiricisms and irrational beliefs". Thus surgery has four components—technology, humanism, science and empiricism. The content of surgery, Churchill avers, differs from the content of internal medicine only in the greater range of surgical technology. Churchill explains that the "content" of surgery is transformed into dynamic functions (to use his phraseology) by means of various "organizational patterns" and these are various combinations of the hospital, the university and the State. The dynamic functions named by him are three in number—the cure of disease (action); the strengthening of the skill to cure by progress (growth); and the perpetuation of the skill to cure by teaching (reproduction). University and hospital, he thinks, achieve significance only as they succeed or fail to transmit faithfully the total content of surgery. "The University is selective in its response to the wave lengths of Science; the Hospital is selective in the expression of Humanism." Churchill's discussion on humanism is full of interest and his historical references, which cannot be mentioned here, will repay study. Of the greatest importance is his reference to the voluntary hospital, whose sincerity and idealism, he holds, cannot be written off as self-interest and bigotry as has been attempted. He states that charity in the literal sense and in the form of alms may disappear from the scene, but that the medical profession would do well to treasure such vestiges as remain. Charity is the "compelling force" of humanism and in this sense is the most precious possession of medicine.

An address which should be read along with the two already mentioned comes from Professor Harry Platt

¹ The Journal of Thoracic Surgery, October, 1947.

² Annals of Surgery, October, 1947.

who spoke on "Medicine, Science and Learning" at the opening of the winter session of the Welsh National School of Medicine last September.¹ Platt referred, *inter alia*, to the "learned tradition of medicine, and particularly to the generations immediately behind the present generations when a humanistic education was accepted as the natural approach to the study of medicine and "before the modern examination system had encouraged precocious specializations". He deplored the fact that today the would-be medical student is effectively segregated as a "specialist" at a comparatively tender age. He holds that more than lip service must be paid to the idea that a liberal education is the essential prologue to the study of medicine and that the portals of entry should be kept wide open, but he does not see that any single comprehensive plan to this end can be found. The intellectual tradition is there to be nurtured, and "the impact of teachers who are men of wide learning on the receptive minds of students with a liberal education behind them will ensure that the flame of scholarship is something more than a mere flicker".

If we have to put into a few words the present-day need in the specialist ranks in medicine we may say that enthusiasm for science must not be allowed to eclipse reverence for humanity. Churchill quotes George Sarton who wrote: "I do not know who is the poorer: the old humanist without understanding of science, or the scientist . . . without reverence. I do not know which is worse: idealism without knowledge, or knowledge without idealism." We may say that the specialist of today (and indeed every practitioner of today) must have a thirst for knowledge for its own sake and also a desire to relieve suffering, because it is a man who suffers. This balance cannot easily be taught. It can be shown by example in senior practitioners; it can be set forth by clinical teachers in lecture room, in ward and in out-patient department; it can be introduced by special intention into clinical discussions wherever they are held. Anything that will tend to interfere with the intellectual or scientific freedom of medical practitioners cannot fail to impair the complete functioning of what Churchill calls the content of medicine and surgery. If we put on one side the extraneous influences of control in medical practice we come to the only possible conclusion that the convictions and the integrity of the individual practitioner are all-important factors.

Current Comment.

CIGARETTE SMOKING AND THE HEART.

RELIABLE information on the effects of smoking is not readily obtainable. A good many individual opinions are coloured by personal prejudices, favourable or unfavourable, and the conflicting conclusions of various investigations are confusing. Probably the greatest dispute relates to the effect on the coronary arteries. Reference was made in these columns on June 18, 1938, to the work of Thienes and Butt, who were very critical of the validity of many previous investigations; they could find no proof that the coronary vessels were affected by smoking. On October 28, 1944, a paper was discussed in which Roth, McDonald and Sheard produced convincing evidence that smoking results in vasoconstriction of the

peripheral vessels, a statement now generally accepted, but they had little to say regarding the coronary circulation.

In a more recent investigation, reported by Robert L. Levy, James A. L. Mathers, Alex A. Mueller and John L. Nickerson,¹ observations were made on the effect of smoking normal and "denicotinized" cigarettes on 48 subjects, of whom 27 were normal persons and 21 had cardiac disease. The experiments were carefully controlled and the results submitted to analysis by an authority on biostatistics. The "denicotinized" cigarettes were commercial brands not apparently regarded as being free from nicotine; their effects were not significantly different from those of normal cigarettes. The averages of the maximal changes observed, in both normal persons and persons with cardiac disease, showed a slight rise in systolic and diastolic blood pressures, as well as a slight increase in heart rate. In neither group was there a significant change in cardiac output. Changes in the form of the electrocardiogram occurred in less than half of the subjects in each group. These were slight and consisted most often of diminished amplitude of the T waves. Cardiac pain did not result in any instance. The greatest variability in effects seemed to depend mainly on individual susceptibility rather than on the presence of disease, so that the decision regarding the advisability of smoking is, in the majority of cases, an individual one. These investigators consider that those who have subjective ill-effects will probably fare better by abstaining, regardless of the presence of a cardiac disorder. On the other hand, they feel that, because of the enjoyment afforded and the emotional satisfaction obtained, patients with inactive forms of heart disease may be permitted to smoke in moderation; "moderation", they wisely add, "is an indefinite term and will vary according to temperament and tolerance for tobacco". Disease of the coronary arteries is not considered as necessarily a contraindication to the use of tobacco, though they ban its use in the presence of peripheral vascular disease. It is also forbidden for those with congestive heart failure, the acute stages of cardiac infarction and active rheumatic carditis, for the same reason as any other factor which will cause an increase, however slight, in the work of the heart.

The discussion which followed this paper produced, not unexpectedly, some dissent. One contributor gave an interesting account of his personal experience of pain of coronary type which had consistently over a period of years followed every venture at smoking. This phenomenon, however, is apparently rather rare. There seemed to be a general reluctance to accept the rather liberal views of Levy and his co-workers as to which subjects of cardiac disease might smoke. However, Levy remained firm in his opinion, which was based on clinical experience as well as on the special investigations. Many will feel that, until it is clearly demonstrated that tobacco does not adversely affect the coronary vessels, caution cannot be relaxed when these vessels are known to be diseased; but it must be conceded that the liberal view has much to commend it psychologically. The very real comfort of his habit to a smoker should not be underestimated in assessing the factors concerned in his well-being.

"AGENIZED" FLOUR.

WHILE engaged in experiments on nutrition during the recent war, Sir Edward Mellanby mentioned to a miller a possible association, long suspected by Mellanby, between so-called "canine hysteria" (a nervous condition with epileptiform features occurring in dogs) and the ingestion of flour. The practical knowledge of the miller led suspicion quickly to flour treated with nitrogen trichloride gas (the "agene" process) which has a bleaching and "improving" effect. Mellanby then carried out experiments and reported² the production of canine

¹ *The Journal of the American Medical Association*, October 18, 1947.

² *British Medical Journal*, December 14, 1946.

¹ *The Lancet*, October 25, 1947.

hysteria in growing dogs by including in their diet flour treated with nitrogen trichloride. The same flour when untreated did not produce the nervous malady. A leading article in the same journal emphasized the importance of Mellanby's findings and suggested that, though there was as yet no evidence that the flour treated by the "agene" process was harmful to human beings, its effect on dogs placed it under suspicion and experiments on human volunteers were most desirable, especially in view of the estimation that 90% of the flour consumed in Britain was "agenized". Later Mellanby reported¹ that the canine hysteria was apparently caused by a toxic substance, produced by the action of the nitrogen trichloride, in the gluten fraction of the dough.

The matter was then taken up in the United States where a similarly high proportion of white wheat flour has been commercially treated with nitrogen trichloride for the past twenty-five years. A series of reports and comments have recently been published.² Maurice L. Silver and a group of workers produced in dogs, by feeding them a diet containing "agenized" white flour, a condition (with typical electroencephalographic patterns) indistinguishable from human idiopathic epilepsy. Monkeys showed asynergy, weakness and tremors sometimes accompanied by cerebral dysrhythmia. G. W. Newell *et alii*, working at the University of Wisconsin, reproduced the effects of "agenized" flour on dogs; flour treated by various other common bleaching methods caused no apparent ill-effects. Cats fed with "agenized" flour developed convulsive seizures; monkeys showed changes in the electroencephalographic patterns, but had no clinical symptoms; rats, chicks and guinea-pigs were unaffected. Preliminary studies on human beings revealed no ill-effects from "agenized" flour, but more detailed investigation is still in progress.

Despite the absence of experimental evidence of harmful effects on humans, Frank G. Boudreau, chairman of the Food and Nutrition Board of the National Research Council, in a letter to the Commissioner of Foods and Drugs at Washington, stated that the Board considered that there was a definite risk of injury to human beings, and that it was unwise to contemplate the continued use of "agene" beyond the minimum period required for readjustment. It recommended further investigation of the toxic effects of "agenized flour", exploration of alternative methods of treating flour with the development of those methods found to be satisfactory and, in the meantime, a reduction in the use of "agene". The fortunate fact was pointed out that the suppliers of "agene" and leading millers and bakers had displayed a most cooperative attitude.

Editorial comment in the same issue as the two papers and the letter already referred to pointed out that hasty and intemperate action might do more harm than good under present conditions of food supply, but that it was important that the medical profession should be interested and kept informed of progress. In Australia the matter is probably only of academic interest at present as it is understood that the "agene" process is not used in this country and, in New South Wales at least, its use would be illegal. However, it is as well that the profession should be informed if only to be able to answer people who may hear garbled versions of what is happening overseas.

THE LOCAL APPLICATION OF SULPHONAMIDES.

MANY individual contributions to medical literature have condemned the indiscriminate use of sulphonamides by local application. The dangers of the consequent development of sensitization were discussed at some length in these columns on May 6, 1944. It was then pointed out that sensitivity so developed might quite readily preclude the administration of any other member of the sulphonamide group when its use was urgently

indicated. The opinion of Tate and Klorfajn was quoted that topical sulphonamide therapy for skin diseases and minor injuries was unjustifiable and should be discontinued. Subsequently the Council on Pharmacy and Chemistry of the American Medical Association issued a statement¹ emphasizing the dangers associated with the external application of sulphonamides, and recommended that "such use should be limited to a comparatively few skin disorders which may be effectively treated by a sulfonamide preparation". The section on Dermatology and Syphilology of the American Medical Association at its 1944 session adopted a resolution officially condemning the indiscriminate local use of sulphonamides when less harmful remedies were equally efficacious.² Recently, to cap the discussion, the announcement has been made³ that, after consultation with leading authorities, the Council on Pharmacy and Chemistry has decided to delete from the 1947 edition of "New and Nonofficial Remedies" the discussion on the local use of the sulphonamides and to substitute the following statement.

Experience gained in World War II seems to indicate that the use of crystalline sulphonamides as topical agents was not very successful in the management of wound infection or in treatment of infections of the skin or mucous membrane. The routine use of sulphonamides as topical applications in wounds, burns and in superficial infections is therefore to be discouraged.

This means that acceptance by the Council of sulphonamide preparations intended for topical therapy is rescinded and a final emphasis is given to previous warnings. Even dermatologists will probably know of few, if any, conditions for which some other safer remedy is not at least as efficacious, so that there now appears to be little justification for the local application of sulphonamides in any circumstances.

BAL AND LEAD POISONING.

It is now generally recognized that BAL (British anti-Lewisite) exerts its effect in arsenical poisoning by competing for the arsenicals with the thiol groups of the tissue proteins, and apparently it acts similarly in relation to various other metals. Reports on its therapeutic value in poisoning with metals other than gold and arsenic have been few and sometimes conflicting, so that it is interesting to note encouraging results in a preliminary report of a case of lead poisoning in which BAL therapy was used by James G. Telfer.⁴ Telfer discusses the generally held theory of the rationale of calcium therapy for lead poisoning, which is briefly that administration of calcium and vitamin D in the active phase promotes storage of lead in the bones; later during clinical remission a decrease in calcium intake and administration of acid-forming salts allows mobilization of the lead in non-toxic amounts so that it may be excreted. Following on this, Telfer suggests that BAL may be an ideal agent for bringing lead into the circulation and aiding its excretion while still holding it, so that it causes no toxic effects. His patient had a history of exposure to lead and the clinical signs and symptoms of chronic lead poisoning, but the urine contained less than significant amounts of lead. Two courses of BAL were given. The first course brought the concentration of lead in the urine to significant levels, and the second, a heavier course, produced considerably greater concentrations. Encouraging clinical improvement occurred. Telfer makes no particular claims in this report, but it is clear that BAL promoted the mobilization and excretion of lead. Whether this process may in other cases be harmful remains to be determined, but the diagnostic and therapeutic possibilities suggested warrant further investigation.

¹ The Journal of the American Medical Association, August 4, 1945.

² The Journal of the American Medical Association, December 22, 1945, page 1194.

³ The Journal of the American Medical Association, September 20, 1947.

⁴ The Journal of the American Medical Association, November 29, 1947.

¹ British Medical Journal, August 23, 1947.

² The Journal of the American Medical Association, November 22, 1947.

Abstracts from Medical Literature.

THERAPEUTICS.

Post-Concussive Syndrome.

HELEN S. E. MURRAY AND H. HALSTEAD (*The Journal of Mental Science*, April, 1947) treated 88 soldiers suffering from post-concussive syndrome which had been present for periods ranging from several months to several years. The usual symptoms of headache, dizziness, irritability, emotional instability, lack of concentration and memory impairment were present. They gave "Afenil" (calcium chloride and urea), ten millilitres of 10% solution, intravenously every second day. Instantaneous vasodilatation was produced, the injection was carried out slowly and little variation in the blood pressure was noted. After the injection the patient rested for two to three hours. The number of injections varied from 10 to 40, averaging about 20; the average stay in hospital was sixty days. Relief of symptoms was invariable and no recurrences were reported in the follow-up investigation, which extended for from three to eight months and covered the majority of cases.

Cirrhosis of the Liver.

L. M. MORRISON (*The Journal of the American Medical Association*, June 21, 1947) describes new methods of therapy in cirrhosis of the liver. He recommends the administration of two grammes of methionine and two grammes of choline chloride daily, a special liver extract containing the vitamin B complex, and a diet with high protein, low fat, moderate carbohydrate and high skimmed milk content. Choline and methionine are said to be cirrhosis-preventing. The author encourages large eating. A diet of 200 to 300 grammes of protein, 300 grammes of carbohydrate and 50 grammes of fat is considered ideal in treatment of cirrhosis of the liver. The author claims that 23 patients treated as above recovered to a much greater extent than patients treated with a diet rich in carbohydrates, and with the intravenous administration of dextrose, sedatives, diuretics and palliatives between 1938 and 1940.

Penicillin Inhalation Therapy.

M. S. SEGAL, L. LEVINSON AND D. MILLER (*The Journal of the American Medical Association*, June 28, 1947) describe penicillin inhalation therapy in respiratory infections. In pneumococcal, staphylococcal and streptococcal pneumonia inhalation therapy is often effective. Sodium or calcium penicillin (25,000 units in one millilitre of normal saline solution) was vapourized and inhaled with oxygen at a rate of flow of five to seven litres for fifteen minutes every four hours. A shunt was used to prevent loss of penicillin during expiration. Patients with asthma did not improve with this treatment as a rule, but those with bronchiectasis, abscess of the lung and acute laryngo-tracheo-bronchial oedema responded well. For the latter the treatment was life-saving. For persistent sinusitis 0.25% solution of "Neo-Synephine Hydrochloride" was used with some success as a shrinking agent before

aerosol inhalation of penicillin. The method should not be used for common colds. Urticarial complications responded to "Benadryl" in some cases.

Electronarcosis.

A. S. PATERSON AND W. L. MILLIGAN (*The Lancet*, August 9, 1947) describe a physiological state known as electronarcosis in dogs and in man, and also a portable apparatus made for them by G. F. Shotton and A. I. Rich with which they can induce this state. The apparatus is connected to electrodes placed on the patient's temples and to the electric mains and it causes a constant current to pass through the brain. It is the authors' practice to pass the current for about seven minutes, and they have treated twenty persons suffering from schizophrenia in this way with "distinctly promising" results. It is suggested that, owing to the simplicity and relative safety of treatment by electronarcosis, it may take the place of insulin coma as the treatment of choice for early schizophrenia.

Contraindications for Leucotomy.

E. L. HUTTON (*The Journal of Mental Science*, April, 1947) reports three failures following leucotomy in which the last stage was worse than the first. The previous personality in all cases showed egoism and lack of social adjustment. The patients had a poor work record and none achieved any real success or gave much evidence of altruistic affection. He concludes that the basic character and outstanding traits of total personality are of greater importance for assessing the probable results of the operation than the particular type of mental disorder from which the patient is suffering.

Contraindications of Shock Therapy.

MATTHEW T. MOORE (*Archives of Neurology and Psychiatry*, June, 1947) questions the validity of regarding certain physical states as contraindications for electric shock therapy. His views are based on the treatment of 2181 patients. In this series 238 patients had organic cardiac disease, 17 were aged over sixty-five years, 190 had hypertension, 18 had general arteriosclerosis, 30 had pulmonary disease and 30 had organic cerebral disease. The author concludes that former arbitrary and rigid contraindications should be relaxed and that the need for treatment should be determined by the over-all physical status of the patient, the severity of the mental condition, the immediacy of the need of treatment and the promise of a favourable result.

Penicillin and "Dicumarol" in the Treatment of Subacute Bacterial Endocarditis.

CHARLES J. THILL AND OVID O. MEYER (*The American Journal of the Medical Sciences*, March, 1947) relate their experiences with penicillin and "Dicumarol" in the treatment of subacute bacterial endocarditis. There were 22 patients with subacute bacterial endocarditis in their series, of whom thirteen received both penicillin and "Dicumarol", and nine were given only penicillin. It is concluded that either form of therapy should be persisted in for a minimum of six weeks. Despite the favourable results obtained with combined therapy, the authors remain

decidedly sceptical that anticoagulant treatment offers any advantages. Furthermore, anticoagulant therapy unquestionably carries with it grave hazards in subacute bacterial endocarditis. Penicillin therapy for fifty-four hours after removal of a focus of infection was found inadequate in the prevention of the development of subacute bacterial endocarditis. It was noted that patients who had received inadequate therapy before coming under observation presented a more difficult problem as far as control of the disease was concerned. Five of seven failures were in this group. All except one of the inadequately treated patients had become subjectively and objectively improved under the original penicillin therapy.

NEUROLOGY AND PSYCHIATRY.

Pain in Neurosis.

W. P. CHAPMAN, J. E. FINESINGER, C. M. JONES AND S. COBB (*Archives of Neurology and Psychiatry*, March, 1947) examined a group of psychoneurotic patients to assess their threshold to pain. A source of heat, which could be controlled, was used for this purpose. It was found that the threshold was the same for this group as for normal persons. In the psychoneurotic group the motor reaction to the pain was more profuse and developed at an earlier stage than in the normal group.

Speech Disorders.

WILLIAM G. PEACHER (*The Journal of Nervous and Mental Disease*, July, 1947) surveys the speech clinics in the United States and British armies and gives their historical background. He summarizes the results of treatment. For best results all patients should be treated in one ward under the supervision of a medical officer. A speech pathologist and psychologist must have a coordinated programme. The approach must be wide and the patient must have the maximum benefit of treatment in hospital for up to a year or more. The author gives a useful summary of remedial exercises for strengthening the palate, jaws, lips and tongue. He concludes with an outline of the four common disorders of articulation and their specialized treatment centre. These are dysarthria (treated at the neurosurgery centre), dyslalia (treated at the plastic surgery centre), dysaudia (treated at the centre for the hard of hearing) and dyslogia (treated at the neuropsychiatric centre).

Causalgia.

P. W. NATHAN (*Brain*, June, 1947) emphasizes Weir Mitchell's definition of causalgia—that causalgia is a burning pain. He describes the types of pain and distribution of causalgia in 160 peripheral nerve lesions. Causalgia is found in complete as well as in incomplete nerve lesions, which suggests that the pain impulses arise in the central end of the damaged nerve. The role of the sympathetic system in pain conduction is considered and the results of sympathectomy as therapy for some painful conditions are summarized. The various theories of causalgia are examined and the writer concludes that the most satisfactory

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hypothesis suggests that causalgia is due to stimulation of the somatic sensory axons by efferent sympathetic impulses at an artificial synapse at the site of the lesion. Impulses arising in this way are referred by the patient to the area of distribution of the sensory nerve.

The Circulus Arteriosus of Willis.

LAMBERT ROGERS (*Brain*, June, 1947) attempts to answer the question whether the circle of Willis functions as a distributing station for equalizing the cerebral blood supply or is merely an anastomosis between main arterial trunks by examination of the anatomy, by injection experiments on the cadaver, by arteriograms in the living subject and by a working model. He concludes that it is an irregular anastomosis between the vertebral and carotid arterial systems and it does not permit a mingling of the blood streams of these two systems. The practical application of these observations is that occlusion of the carotid artery in the neck reduces the blood flow within any aneurysmal sac on its intracranial course below or above the circle of Willis.

A Mid-Brain Syndrome following Head Injury.

MICHAEL KREMER, W. RITCHIE RUSSELL AND G. E. SMYTH (*Journal of Neurology, Neurosurgery and Psychiatry*, May, 1947) describe nine cases of severe closed head injury followed by clinical signs which, they suggest, indicate injury to the mid-brain above the decussation of the superior cerebellar peduncles. The dominant clinical signs were severe dysarthria and disturbance of balance. The affected limbs tended also to have increased tendon reflexes, Parkinsonian-like tremor and, in one case, sensory loss. Oculomotor and pupillary disturbances were also present. In two cases encephalography showed dilatation of the aqueduct of Sylvius.

Hypnosis and Crime.

JEROME M. SCHNECK (*The Journal of Nervous and Mental Disease*, August, 1947) discusses the question as to whether criminal behaviour can be initiated by hypnotic influence and asks for reevaluation. The case history of a soldier is reported. The man, whilst in the hypnotic state, was told to present himself for treatment at a later date. Because of changes in the routine, it could be accomplished only by his being absent without leave, thereby creating a punishable crime. The patient duly presented himself for treatment, though it was obvious from his emotional state that he knew that he was doing wrong.

Sensory Disturbances Associated with Intervertebral Disk Protrusions.

MURRAY A. FALCONER, GAVIN L. GLASGOW AND DAVID S. COLE (*Journal of Neurology, Neurosurgery and Psychiatry*, May, 1947) examined the sensory disturbance in fifty persons with protruded intervertebral disks involving the fifth lumbar and first sacral nerve roots. They showed that the area supplied by the fifth lumbar root involved the dorsum and middle three toes of the foot, the lateral surface of the leg, and, on the thigh,

a spiral area on the lateral and posterior aspects ending in the lumbar region at the mid-line. The area supplied by the first sacral root had the same general form, but lay more laterally. They critically discuss current dermatome charts and they conclude that the nervous supply of the dermatomes of the limbs extends the whole length of the limbs and that there is considerable overlap, especially in the proximal parts of the limbs.

Subnormal Types.

D. CARADOC JONES (*The Journal of Mental Science*, April, 1947) summarizes some of the conclusions drawn from a social survey made in 1930 in the Merseyside district. The investigation covered 6906 families, comprising a population of 28,845. The author concludes that whatever form the subnormality takes, whether in hearing, sight, intelligence, physique, health or employability, the majority of cases are discovered in the unskilled labouring class with families above average size. There appears to be a negative correlation between intelligence and size of the family, and it seems probable that the average level of intelligence amongst the general population is declining, and that physical characteristics such as health and strength are declining while neurotic and delinquent tendencies are increasing.

Child Schizophrenia.

J. LOUISE DESPERT (*The American Journal of Psychiatry*, July, 1947) outlines the clinical history of seven patients, six boys and one girl, who came for treatment at ages varying from three years and ten months to seven years and nine months. The onset was acute in three cases and insidious in four cases—in the latter after several years of pathological behaviour. All had frankly psychotic presenting symptoms. Contact and affective disturbances were present, often with a total withdrawal of interest. Bizarre and distorted thinking was present in all cases and hallucinations in four. Stereotyped movements, mannerisms and motor disorganization were observed in every case. The investigations and treatment were conducted along psychoanalytical lines over many sittings while the children were living at home. The author's opinion as to prognosis is guarded, but he considers that progress was encouraging.

Indirect Technique to Induce Hypnosis.

MORRIS H. ADLER AND LAZARUS SECUNDA (*The Journal of Nervous and Mental Disease*, August, 1947) draws attention to the hocus-pocus methods of inducing the hypnotic state and describe a method for overcoming "patient fear and doctor difficulty". The doctor makes no direct suggestion that he will hypnotize or put to sleep. The patient is told that the doctor will teach him to relax and concentrate. He is told to let his muscles go limp and then asked to fix his glance on the thumb and forefinger of one hand. The doctor then states: "I am going to ask you to close your eyes soon, but continue to concentrate on your thumb and forefinger. As you concentrate I shall count, and as I count you will become more and more relaxed. As you do so you will feel your thumb and fore-

finger draw closer and closer together. When they touch you will then know you are in a deep state of relaxation." After this explanation, the patient is requested to close his eyes and concentrate on the thumb and forefinger. The doctor repeats his previous statement from the reference to counting. After this preliminary incursion, the movement of larger muscle groups is undertaken. The authors make the significant claim that no patient has ever expressed objection to the method.

Psychosis with Rheumatic Brain Disease.

WALTER L. BRUETSCH (*The American Journal of Psychiatry*, July, 1947) draws attention to psychosis associated with rheumatic brain disease and sub-clinical rheumatic fever. Four case histories with autopsy findings are given. The author states that sub-clinical rheumatic fever may be suspected in every individual in the presence of rheumatic heart disease. Fever and leucocytosis are less reliable guides to activity, but a slightly to moderately increased sedimentation rate is of definite value, and is often present when the other two test results are normal. He makes it clear that the sedimentation rate cannot be used to differentiate rheumatic encephalopathy from other forms of psychosis. The type of psychosis appears to conform generally with that found at the different age periods, and is not peculiar in itself.

Mental Deficiency and Differential Fertility.

J. A. FRASER ROBERTS (*The Journal of Mental Science*, April, 1947) reviews intelligence quotient studies made on 3400 children of Bath. The dullest 4% of children came from families two and a half times as large as those of the brightest children. It appears to be a universal tendency for like to marry like, and this is true for intelligence. The relationship of the intelligence quotient of parents and children is analysed. The bulk of high-grade mental defectives do not come from actual mentally defective parents, but from dull parents. It seems that the number of people with an intelligence quotient below 70 will be doubled in the next fifty years, while the number of those with an intelligence quotient above 130 will be halved. The decline in inbreeding over the last hundred years due to increased transport facilities has rather delayed the estimated decline of intelligence.

Narcosynthesis after Insulin Shock.

SOL LEVY AND H. A. PERRY (*The Journal of Nervous and Mental Disease*, August, 1947) on days scheduled for narcosynthesis keep the patient in coma for forty-five to fifty minutes and terminate hypoglycaemia by stomach feeding. "Sodium Amytal" (7.5 to 15 grains) is given slowly until the desired "temporary state of veritable intoxication" is reached. Narcoanesthesia lasts from thirty to sixty minutes. Later in the day a further psychotherapeutic session is held in order to bring up points discovered in the narcosis. Three combined sessions are conducted weekly. As a result of experience in eleven cases the authors conclude that the results are superior to those of insulin shock per se; the duration of hospital stay in all cases was appreciably lessened.

British Medical Association News.

SCIENTIFIC.

A MEETING of the New South Wales Branch of the British Medical Association was held on December 11, 1947, at the Robert H. Todd Assembly Hall, British Medical Association House, 135, Macquarie Street, Sydney, DR. A. C. THOMAS, the Past President, in the chair.

Surgery of the Aged.

DR. J. W. S. LAIDLEY read a paper entitled "Risks Associated with Surgery of the Aged" (see page 136).

DR. P. L. JOBSON read a paper entitled "Risks Associated with Surgery of the Aged" (see page 138).

DR. JOHN STOREY, in opening the discussion, said that he had been informed some weeks previously that Dr. Laidley and Dr. Jobson were to read papers and that he would be expected to attend the meeting and throw stones at them. His mother had told him that he was very fond of throwing stones when a boy, but that he had been cured when a stone descended on his own head. Dr. Storey thought it would be more appropriate to throw bouquets at the speakers, who on the whole had covered the ground very well. The title of the subject was somewhat vague—"Risks in the Surgery of the Aged". First of all Dr. Storey wondered when one was considered aged. Thirty years earlier he had regarded the age of sixty years as being quite old, but now he thought of it as quite young; Dr. Jobson had mentioned some comparatively young people whose tissues had degenerated and who could be dubbed aged. Dr. Storey said that one principle that should be observed irrespective of the age of the patient was the question of whether surgery was necessary and in the best interests of the patient. The criterion to be applied was whether the operation would be performed if oneself or a dear one was the patient; there was a tendency amongst the medical profession to forget the patient's point of view. It seemed to be unavoidable and, of course, was noticeable with some professional men more than with others. The next principle that should be observed was that as little as possible should be done, and done as gently and quickly as possible, the surgeon making sure that the patient was put on his feet as soon as possible. There could be no gainsaying the accepted dictum that old people stood bed very ill. If an old man with nothing wrong with him was put to bed for long, he would not be a strong man when he got up and stood the chance of contracting hypostatic pneumonia. Intravenous administration of fluid and salt solution had been mentioned, and Dr. Storey said that there was no doubt that both in their place were admirable; but he had a shrewd suspicion that not a few patients had been washed into a watery grave on a flood of "intravenous saline". He did not think the danger of drowning the patient, literally, was recognized sufficiently. Dr. Storey then referred to the problem of post-operative function, thrombosis and phlebitis with subsequent embolism. He had had the privilege of observing the influence of the method of Cummine on several of his own patients at the Royal Prince Alfred Hospital, and as far as he could tell it was excellent; quite a number of patients had been saved by the administration of heparin. If a patient commenced to complain of pain in the calf and if the coagulation time dropped to a dangerously low level, then it was advisable to introduce heparin. Mention had been made of the danger of diabetes. Dr. Storey recalled performing appendicectomy and thinking that he had pulled another patient out of the grave when he met the general practitioner who had referred the patient to him. By mere chance the general practitioner informed him that the patient was diabetic. But for this information the patient would surely have died in diabetic coma. Ordinary tests should be carried out, and when a patient was really old, in the sense that the tissues had degenerated, then it behoved all practitioners to avoid risks. Hemoglobin tests should be carried out, and also an estimate of the blood urea content should be made, and if necessary, tests pertaining to kidney function should be carried out. With regard to anaesthesia, Dr. Storey said that the whole outlook was changed, as nowadays it was possible to obtain the services of an expert and to leave things entirely to him. It made all the difference in the world, as far as the comfort of the surgeon was concerned as well as the safety of the patient, to have an anaesthetist who knew his work. With regard to spinal anaesthesia there was need to issue a warning to be careful of two things: firstly, not to give too large a dose, and secondly, not to place the patient in the Trendelenburg position too

soon. Dr. Storey referred to a fatality which had occurred when the latter requirement was not observed. He concluded by saying that he had been delighted to hear the two speakers and also to say something in appreciation of them.

DR. S. V. MARSHALL said that unfortunately he had arrived too late to hear the paper by Dr. Laidley and had also missed portion of the paper by Dr. Jobson. He was much impressed with what he had heard, and wished to offer Dr. Jobson his congratulations. Reference was made by Dr. Jobson to "Neo-Synephrine", which was a most powerful and potent drug, and to the giving of as much as two millilitres subcutaneously. It was often overlooked that the failing circulation might leave unabsorbed any such stimulating drug, and then when the circulation recovered after several doses had been given, the whole lot was rapidly absorbed, with most undesirable effects. Another point was about the excessive use of atropine, which was very important, especially in old people. By causing an increased viscosity of the bronchial secretions large or repeated dosages of atropine favoured the onset of bronchiolar occlusion, patchy atelectasis and bronchopneumonia.

DR. KEITH KIRKLAND said that he would like to thank the speakers for their interesting papers. He thought the ground had been well covered. Dr. Jobson had said that any old patient should always be regarded as having heart disease. In Dr. Kirkland's opinion this could not be too strongly stressed; he also held that any old male patient requiring operation or having any medical illness should be regarded as having a potential bladder neck obstruction, and this fact should be kept in mind. It was well known that minor procedures such as cystoscopy caused retention of urine in elderly male patients who had an enlarged prostate, and when other surgery was planned, which had no relationship to the urinary tract, it should be borne in mind that the least surgical intervention might be sufficient to interfere with the function of micturition. Another point was that two or three days after operation in such cases it was necessary to make certain that the bladder was being emptied and that the passage of urine—even when reported as being satisfactory—was not due to retention with overflow, for then uraemia commenced. It was possible for this to occur in cases of fracture, ulcer *et cetera*; urine was passed the next day and recordings might show a fairly adequate quantity, yet the bladder, through having to deal with the last straw as it were of an obstruction, might break down, retention with overflow supervene, and the condition not be recognized because the urinary figures were still relatively normal. This was reversing Dr. Laidley's observations of complications normally encountered in urology; but Dr. Kirkland thought it was rather a matter of complications that cropped up from the point of view of the general surgeon and often also from that of the general physician.

DR. R. J. SILVERTON said that he had enjoyed the lectures very much. He wished to congratulate Dr. Laidley and Dr. Jobson for the splendid way in which they had delivered the papers. Dr. Laidley had covered the subject from the various clinical aspects, which was most helpful, and Dr. Jobson had dealt with the scientific aspect, which was very illuminating. Dr. Laidley had mentioned the different types of patients; in Dr. Silvertown's opinion the slim, frugal-living farmer was about the best possible risk. In regard to the statements about mental confusion and the trouble it caused, Dr. Silvertown said that the extraordinary thing about patients who were temporarily mentally confused, hopped out of bed during the first twenty-four hours, pulled out tubes *et cetera*, was that apart from the question of local damage no general harm was caused. The question of the constancy of the blood pressure during operation clearly indicated the necessity for close cooperation with the anaesthetist, and Dr. Silvertown thought it was an excellent thing to have a meeting combining the two specialties. In regard to spinal anaesthesia, he had taken an interest in it for many years, and since the introduction of ephedrine the main thing was to keep the blood pressure constant and on no account to allow it to fall. "Neo-Synephrine" was a useful drug when the blood pressure fell, as it raised the pressure rapidly. Before the introduction of "Neo-Synephrine", ephedrine had been able to do this with difficulty and only after the use of very large doses. The whole point was that the blood pressure should not be allowed to fall. Spinal anaesthesia should not be used for patients whose cardio-vascular system was in such a state that it was doubtful what effects the pressor drugs would have. If such drugs were administered, they should be given in a prophylactic and fractional manner. The first dose of a pressor drug should not be given before full analgesia had reached the level of the pubis, and the second dose should

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not be given until full analgesia reached the umbilicus. Even if anaesthesia was made to extend to the level of the nipples a third dose of the pressor drug was seldom necessary, but the blood pressure should be estimated, and if it fell even ten millimetres, the third dose should be administered. The dose was one millilitre of 3% ephedrine solution given subcutaneously and not too slowly, and if "Neo-Synephrine" was preferred the dose was 0.5 millilitre of 1% solution. For a prophylactic safe method ephedrine was the better drug, because of the more even action. "Pentothal", of course, had been most helpful to urologists. The development of anaesthesia as a specialty had been a great comfort to surgeons, especially to urologists, who had to deal with nervy and old people. The preliminary discussion between the surgeon and the anaesthetist was particularly reassuring, although at times both made mistakes. Dr. Silvertown remembered one patient to whom it was decided to give "Pentothal", and they had had a very bad time with the patient on the operating table, artificial respiration *et cetera* being required. A week later the operation had been successfully performed under spinal anaesthesia. In urological practice much time was taken up with diagnostic work, which needed only sacral cover. Endoscopic resections required anaesthesia to a low level. In the presence of cardio-vascular conditions to be able to work with local anaesthesia in any part of the body would be ideal, but unfortunately this was not always practicable.

Dr. B. T. EDEY said that he felt it a duty to add to the discussion as he had had considerable experience with aged patients. The two speakers had covered the subject admirably, and he congratulated them. The great advances that had been made in the surgery of the aged were due to the advances in anaesthesia and to the improvements in the preparation and after-care. In the earlier days, when surgeons had to depend upon chloroform and ether, it was considered a grave risk to operate upon an aged patient. If, for example, the patient had acute appendicitis, he was usually left to get better or not by his own devices. As time progressed and anaesthetic methods *et cetera* improved, that attitude changed, and the surgeon learned to deal with the aged as he was accustomed to deal with the young. But it was not so many years since the change had occurred. This new attitude applied to all branches of surgery. Dr. Edey recalled two elderly women who had recently undergone operation for carcinoma of the right side of the colon and convalesced smoothly. One of them, a few days after operation, asked when the operation was to eventuate—she had no idea that it had already been done, and she completed her recovery in much the same frame of mind. That happy state of affairs was due, in the main, to efficient anaesthesia. Dr. Edey agreed with Dr. Laidley in that he preferred to see patients, especially those who were not good subjects for surgery, in his rooms, where he could observe them disrobing and mounting the examination couch. It was possible in those few minutes to form a useful estimate of the patients' vitality *et cetera* without appealing to special aids. One patient, aged over ninety years, had a hernia and insisted on having it repaired; he said that he did not want to have the hernia all his life. He scarcely felt the operation, was out of bed very early and had no undue discomfort. Little hesitation need be felt in operating upon the man who worked on the land and was spare in build. The city man who lived well was not so good a risk.

Another factor in the aged was the pre-operative preparation. It was a great advantage to the patient about to undergo a serious operation to be in hospital for four or five days at least or even a month or more to be observed and prepared. Post-operative preparation also was very important, and often helped the patient through when otherwise the operation might be a failure. Thus the outlook for the aged surgical patient was much better than it had been; many more aged persons were undergoing operation than in the past. The proportion of aged people in the population was increasing, and there would be more and more seeking the aid of the surgeon. Perhaps it might be asked whether it was worth while attempting to extend life in the aged in these days of stress; but that was not the attitude of the old people themselves. Many had a strong desire to live and to continue to be active and useful citizens.

Dr. H. J. DALY said that he had enjoyed the papers. Dr. Laidley had raised points of interest to all those present, and Dr. Jobson had covered the ground adequately. Referring to coronary occlusion, Dr. Daly said that both Dr. Laidley and Dr. Jobson had spoken of it. Dr. Jobson in relation to anaesthesia. Dr. Daly had given anaesthetics to numbers of elderly people who had had a recent or an old coronary occlusion, and had never had cause to regret it. It would be wrong to turn a patient down on that account. With regard to the value of electrocardiograms, the anaes-

thetist might be guided by them but not actually influenced by them. As Dr. Jobson had pointed out, most aged people were found to have myocardial degeneration or coronary sclerosis. But if one was prepared to give them extra care, oxygen and a good airway, one should not turn them down. Referring to patients with hypertension, Dr. Daly said that at the present time anaesthetics were often given to people whose systolic blood pressure was as high as 240 millimetres of mercury, and in fact many patients were now operated on for relief of hypertension under anaesthesia lasting for one and a half to two hours. However, such people should not undergo minor operations under general anaesthesia if local anaesthesia would suffice. Dr. Laidley had said that aged people were not apprehensive. Dr. Daly thought that they were seldom worried about the anaesthetic. Young people were apprehensive and scared about anaesthetics, but old people were not; they felt they had little to lose and they wanted only relief. Another speaker had stressed the importance of rest for old people before operation. Dr. Daly said that that had been brought home to him clearly by the late S. Harry Harris, the most prominent urologist in Sydney in his time. It had been his practice to ensure that these people entered hospital in time for a rest before operation—sometimes as long as a month or six weeks. They were allowed out of bed when he thought them sufficiently rested, after perhaps three or four days or a week. They sat in the sun, gastro-intestinal irregularities were corrected and they took lots of water. Dr. Daly said that many of these patients were anaemic, but did not look it. A blood count should be made and a blood transfusion given if necessary, or made ready for use at the time of operation. Another point was that the anaesthetist observed these patients and was thus enabled to select the most suitable type of anaesthetic to give them. It was often difficult. They suffered from all kinds of complications such as bronchitis, myocardial degeneration, cardiac disease, glycosuria and renal failure. The anaesthetist had to rely on the clinical findings, and ability to choose the right anaesthetic could be gained only by long experience. With regard to ether and "Pentothal Sodium", Dr. Daly said that from 1926 to 1936 when he was giving anaesthetics for Harry Harris he used mostly ether given by the intratracheal route, and these patients did surprisingly well. A curious thing about the aged was that, although it was suspected that death on the operating table was more common among them than among younger people, it was actually rare; old people took anaesthetics well. They could have ether if they were given oxygen and were rested before operation. One had to be careful with "Pentothal"; the amount of anaesthetic given should be cut down to a minimum. A patient undergoing prostatectomy could receive 1.0 to 1.5 grammes of "Pentothal" intravenously, but it was wise to be cautious about exceeding that dose. The surgeon should aim at finishing the operation in about thirty minutes to forty-five minutes. In conclusion, Dr. Daly paid a tribute to surgeons in Sydney who had encouraged the anaesthetist to develop the modern advances which he now enjoyed.

Dr. THOMAS, from the chair, thanked Dr. Laidley and Dr. Jobson for their papers on behalf of those present, and congratulated them on the interesting subject they had discussed. He said that it was a good idea to combine the Section of Urology and the Section of Anaesthesia, because there were no members of the medical profession whose practice lay so much among the aged as the urologists. Speaking as one who had had to deal with aged people representing surgical risks, Dr. Thomas thought that the anaesthetists also had helped in overcoming the risks many old people had to take. When one was faced with an aged person in general surgery, the patient was always a very sick man or woman; the condition might be intestinal obstruction, jaundice due to malignant growth or simply a great deal of pain. One had to consider the patient differently altogether from a younger person. If one saw acute appendicitis of some days' standing in a young person, one might not hesitate to institute the Ochsner-Sherren treatment; but in the case of an older patient operation was necessary in an attempt to save the patient. However, like other speakers, Dr. Thomas felt that the general impression of the patient one obtained at the beginning was one that was of value all through. The patient himself, too, could help considerably. Dr. Thomas recalled an old woman, aged eighty-four years, who was subject to very severe attacks of biliary colic without jaundice, but associated with cholecystitis. She was in bed, the cholecystitis had subsided and she was much better; but she had had several of these attacks and did not want any more. Dr. Thomas was rather diffident about doing anything more, and was pleased when the patient's daughter telephoned him and requested him not to operate on her mother. He went and saw the patient, told her that she was much better and could go home, and

said that they thought she would be free from attacks. The patient then asked whether she was not to be operated on, and was told that she would be all right. She then said that she knew what had happened—her daughter had telephoned Dr. Thomas and asked him not to operate on her. But the patient pointed out that she had the pain, her daughter had not the pain, and she herself wanted the operation. She was operated on and made an uninterrupted recovery. That story was fairly typical of these aged patients. If they felt that they wanted the operation their cooperation was very helpful. Those present at the meeting had profited by being there. In conclusion Dr. Thomas thanked Dr. Laidley and Dr. Jobson for bringing forward their interesting material.

Dr. Laidley, in reply, said that he had been interested in listening to the various speakers. He was unable to argue with them. One or two points had struck him. Dr. Storey had referred to the danger of the injudicious intravenous administration of fluid after operation, and to the drowning of patients by fluid so administered. Dr. Laidley a week or so earlier had been speaking to Dr. Lorimer Dods, who had recently returned from America, and who while there had spent some weeks in the medical school of Harvard University, paediatric section. In that medical school there was a professor of fluid imbalance who found himself very busy, and there was also a professor of protein imbalance who also found himself very busy. Another point was the cerebral degeneration that afflicted some old patients after operation. Dr. Silverton had referred to the old man who became uncontrollable for a short time and kept getting out of bed; he did not as a rule do himself any harm. Dr. Laidley quite agreed that this was so, provided that the patient responded to sedation and was restored to his right mind within twenty-four to forty-eight hours. But if he continued in an uncontrolled and semi-maniacal state for a week or more he would not recover. When an acute and grave mental condition supervened and could not be controlled the patient's only chance was to have two or three special nurses so that one was always on duty. It was not possible for many patients to have this attention, either public, intermediate or private patients. But occasionally one could save such a patient. However, acute cerebral degeneration not responding to sedation was one of the gravest post-operative complications that could occur to the aged.

Dr. Jobson said that he had been most interested in listening to the various speakers. In view of the fact that medicine was more or less a controversial subject, he had been surprised to find how completely they all were in agreement; that seemed to suggest that they might be on the right track. Dr. Daly had mentioned the use of "Pentothal" and the restriction of the amount. There were two things to remember about "Pentothal". Firstly, when the patient appeared to be coming out of the anaesthesia it would usually last rather longer than one expected. It was possible to anaesthetize an aged patient for an operation with rather less "Pentothal" than one would think. He had discovered that in trying to economize with "Pentothal". The second point was that the more he saw of it the less he really liked exceeding a dose of one gramme. A further point was the outlook on routine. Dr. Jobson thought that there was very little use for routine in medicine, certainly not in connexion with anaesthetics for old people. It was impossible to say that any particular amount of any drug was the dose that must be given to all people over a certain age. Everyone had to be considered on his merits; the patient had to be considered rather than the special tests *et cetera*. Mention had been made of hypertensives. Dr. Jobson said that as far as he could judge hypertensives seemed to do very well. He never felt quite happy about them because he was always worried about what was happening inside their arteries when their blood pressure went down, as it nearly always did in anaesthesia. In conclusion, Dr. Jobson said that those who had joined in the discussion had added to and rounded off very well what he had tried to say.

Medical Societies.

MELBOURNE PÆDIATRIC SOCIETY.

A MEETING of the Melbourne Pædiatric Society was held on July 9, 1947, at the Children's Hospital, Carlton, Melbourne. Dr. JOHN B. COLQUHOUN, the President, in the chair.

Fibrocystic Disease of the Pancreas.

DR. DAVID PITT read a paper entitled "Fibrocystic Disease of the Pancreas: A Review of Fourteen Cases". This paper was published in the issue of January 24, 1948.

Dr. J. W. GRIEVE said that Dr. Pitt had given a masterly review of the subject in a comparatively short time. His address stimulated those present to investigate the patients thoroughly. The first patient was interesting in that he exhibited eczema, which apparently occurred in a proportion of cases, though this was not the experience in Melbourne. The presence of an irritating cough in this case was another interesting finding. Dr. Pitt had mentioned the similarity of the cough to pertussis. In the second case the liver and spleen were palpable. This patient was the type of child who would present the liver syndrome in later life, if he survived. Dorothy Andersen did not mention enlargement of the spleen in her cases, although some patients had hepatomegaly. Recently Dorothy Andersen had elaborated the celiac syndrome. Some very instructive reading was to be found in the article, which had appeared in a late issue of *The Journal of Pediatrics*. Dr. Grieve concluded by saying that in lecturing to students on the history of celiac disease he would now have to add to the list of famous names that of David Pitt.

Dr. KATE CAMPBELL offered her congratulations to Dr. Pitt. She said that meconium ileus was always mentioned in connexion with these cases. She had found only one such case. The baby presented signs of intestinal obstruction, the meconium was thick and putty-like, and the baby recovered after an enema had been given. It was possible that the condition occurred more frequently, and indeed a nurse with experience with newborn infants had told her she had often seen meconium plugs. Dr. Campbell went on to say that technical difficulties arose in carrying out duodenal aspiration and analysis. A simple test might be to estimate the trypsin content of the stool, and this indeed had been advised by Professor R. D. Wright. Dr. Campbell asked Dr. Pitt whether he noticed any ill effects from a moderate amount of fat in the diet of these patients. Fat appeared to provoke large stools, and interfered with the absorption of the other elements. Pancreatic enteric-coated capsules were often advised in the treatment of this condition. On one occasion on which they had been given, the nurse found something like a button in the stool of the child; this proved to be the capsule. The child's protein digestion must be sufficient to digest the covering of the capsule. It would appear that a powder might be more rational. In conclusion Dr. Campbell said that she had had experience of one case in which penicillin inhalations with Andersen's technique had given gratifying results. It was, however, too early to cast judgement from only one case.

Dr. ROBERT SOUTHEY said that he had come across a case of meconium ileus a few months earlier. The patient was a newborn baby who on the third day presented signs of intestinal obstruction, with vomiting and abdominal distension. Dr. Southey wondered whether the condition might be a volvulus or a diaphragmatic hernia. An opaque meal examination and a barium enema examination were carried out. These showed a delay in the stomach. Dr. Hallam stated in his report that the bowel was distended with meconium. The baby was dehydrated and very ill. A surgeon was called in, and after rectal examination an enormous meconium stool was passed. However, the abdomen became distended again, but more permanent improvement followed the exhibition of "Prostigmin". Dr. Southey asked whether there was anything in the literature to record the subsequent history of those babies surviving meconium ileus. Dr. Southey said that he had had another child, aged four years, in hospital with clinical evidence of the syndrome. At autopsy gross bronchiectasis was found, whilst the liver presented fatty changes but no cirrhosis. Dr. Southey asked whether in the case of the two children shown by Dr. Pitt pancreatic medication would be necessary permanently, or whether there was a chance that the pancreas might regain its function.

Dr. ALAN PENINGTON said that the syndrome might well be regarded as a group of several conditions or different phases of the one condition. Fibrosis was met with in the lung, the liver and the pancreas. Was it justifiable to label the disease fibrocystic disease of the pancreas? The disease might be developmental and post-natal with various gradations; if it was gross, fibrocystic changes were met with in the pancreas. One sometimes saw a migrating type of pneumonia terminating in bronchiectasis. In some cases the pulmonary conditions might predominate, whilst in others the hepatic state might be more prominent. Patients who had minor degrees of pancreatic involvement sometimes recovered.

DR. REGINALD WEBSTER said that Blackfan had found 35 advanced cases in 2800 autopsies. The condition was unsuspected during life. In addition he had found 200 cases in which the lesions were much less pronounced. At the Children's Hospital, Melbourne, they had had the experience of finding changes in the pancreas at autopsy in a child who had apparently died of malnutrition or failure to thrive. The view taken by Blackfan was that the pathological condition was referable to an abnormal secretion which was liable to inspissation, not only in the pancreas, but in the bronchus and possibly elsewhere as well. So they should examine, not only the pancreas, but also the salivary glands, which were similar in many respects to the pancreas. Dr. Webster went on to say that the cirrhosis of the liver seen in these cases presented a pattern not seen in other states, so coarse it was. He would never forget the first case at the hospital. The patient was a girl from Warragul, who had died suddenly and inexplicably. At the post-mortem examination the pancreas was examined closely, with the idea that the condition might have been diabetic coma. An insubstantial organ was found, fibrotic and containing one macroscopic cyst. The question whether cirrhosis developed or not seemed to be a question of duration. In young children, no evidence was found of cirrhosis. In intermediate cases fatty changes were met with in the liver, and these no doubt would be superseded by fibrosis if the patient lived long enough. Dorothy Andersen did not make much of these cirrhotic changes. Dr. Webster said that it was his intention to study closely the pancreas of any child failing to thrive, and also to examine the salivary glands more often. A periodical review such as the meeting had provided was of great value to the society. He shuddered to think of how many of these cases had been missed.

DR. IAN WOOD offered his congratulations to Dr. Pitt. He said that it was to be accepted that the liver condition was secondary to the pancreatic conditions, and there was nothing mysterious about this. Similar conditions were met with in chronic alcoholism—first, a fatty liver developed, and later cirrhosis. They must correlate the changes in the pancreas and lung. They must be led to believe that changes were met with further afield also, and Dr. Wood was glad to hear that Dr. Webster had his eye on other parts such as the salivary glands.

DR. M. KENT HUGHES said that he had experience of two cases. The first was originally regarded as one of pertussis. The child had several acute respiratory infections until he was given 0.5 grain of sulphadiazine twice a day as a prophylactic. He had remained well for three winter months on this therapy. The second child was younger. He passed two stools, examination of which revealed excessive fat. Neither child had been found to have trypsin in the stool on repeated examinations. This test was considered sufficiently significant of pancreatic dysfunction.

DR. PITT, in reply, said that the estimation of trypsin in the stools had been used as a diagnostic procedure by others. Enteric-coated capsules might not be all that they were held to be. It was his experience that a normal fat intake by these children caused bouts of diarrhoea which diminished when the fat intake was reduced. In reply to Dr. Southby, Dr. Pitt said that he had not read of any patients with meconium ileus who had recovered. Pancreatin had to be administered permanently. Dr. Pitt thanked the various speakers for their kind remarks.

Bulbar Poliomyelitis Treated by Tracheotomy.

DR. H. McLORINAN showed a male child, aged eight years, who had been admitted to the Queen's Memorial Infectious Diseases Hospital, Fairfield, on April 18, 1947, with a history of a cold of six days' duration. Two days before his admission to hospital it was noted that his voice was nasal and that he had slight difficulty in swallowing. He was admitted at about 4 p.m. with a temperature of 102.6° F., a pulse rate of 104 per minute, and respirations numbering 26 per minute.

On examination of the child, pronounced neck and back stiffness was present, and he was unable to sit up without help. His voice was very "nasal", the palate was immobile, and he was completely unable to swallow. The lumbar puncture findings confirmed the diagnosis of poliomyelitis; sixty cells were present per cubic millimetre of cerebro-spinal fluid, forty being polymorphonuclear cells and twenty lymphocytes. During the next twelve hours his condition deteriorated. In spite of posturing and the frequent use of suction to the posterior part of the pharynx, mucus and saliva accumulated and caused obstruction to breathing. The child's voice also became weaker and his cough ineffective. By morning he had developed laryngeal stridor, apparently caused by adductor spasm. He was extremely

restless, and his colour was poor. It was obvious that a clear airway must be obtained immediately. There was no indication for respirator treatment, as the respiratory muscles were working normally. A tube was inserted into the larynx without difficulty, and some relief was obtained. When the adductor spasm was relieved, it was an easier matter to perform a tracheotomy, and this was done immediately under local anaesthesia with almost complete relief. His colour and pulse improved, and he was able to breathe comfortably. During the next few days his breathing at times was shallow and irregular, but there was no indication for the use of the respirator. The tracheotomy airway was kept clear by the use of suction by rubber catheters and by the instillation of sodium bicarbonate solution into the tracheotomy tube to free any thickened mucus. Penicillin and sulphonamides were given as prophylactics against secondary invaders. Nutrition and fluid balance were adequately maintained by Rehuss tube, and fluid was also given rectally.

On April 25, seven days after his admission to hospital, he was able to swallow a little nourishment. On April 29 the tracheotomy tube was removed and his voice had returned. On May 19 he was allowed out of bed. His palate was still immobile, and he still had slight difficulty in swallowing, but otherwise no muscle weakness was present.

DR. McLORINAN said that patient was shown to illustrate severe bulbar poliomyelitis in which life was saved by a timely tracheotomy. In this case the indications for tracheotomy were obvious; in addition to the mucoid obstruction, the adductor laryngeal spasm produced urgent anoxemia. However, the subsequent management of the patient was so much easier than that of previous patients with pharyngeal paralysis, that it was the intention at Fairfield to perform the operation earlier in future, even though the symptoms might not be so urgent. Experience with pharyngeal paralysis following diphtheria supported this view. The clinical picture in that condition was similar to pharyngeal paralysis in poliomyelitis. When diaphragmatic paralysis developed as well, the similarity was even more pronounced.

DR. McLORINAN went on to say that in the last twelve months two patients with diphtheritic pharyngeal and diaphragmatic paralysis had been successfully treated by the operation of tracheotomy. Previously such patients had been treated in the respirator, with rather disappointing results. The idea was not new. The first report Dr. McLorinan had seen was by T. C. Galloway and was published in *The Journal of the American Medical Association*, Volume CXXIII, 1943, at page 1096. The onset of grave symptoms in bulbar poliomyelitis could be often dramatically sudden. The clinical picture of the patient almost drowning in his own respiratory tract secretions was not uncommon in poliomyelitis epidemics. The mechanism of death in these patients was often obscure. Undoubtedly some died from true central respiratory failure; but it was reasonable to assume that this central failure might be hastened by a period of anoxemia. Patients with bulbar paralysis did badly in a respirator. Aspiration pneumonia and atelectasis were common. The respirator did not supply an airway. In fact, it might have the opposite effect by sucking mucus into the trachea and bronchi. The objects of the operation were twofold: (i) to by-pass the pool of mucus which collected around the entrance to the glottis; (ii) to be able to clear by suction any secretions which collected in the trachea and bronchi. The nursing advantages were twofold: (i) the suction of the pharynx and trachea were carried out with much less distress to the patient; (ii) the feeding of these patients by a nasal catheter or a Rehuss tube was also done with less risk and distress to the patient. It was probable that fewer of these patients would have to go into the respirator if a clear airway could be maintained. However, if there was extensive involvement of the respiratory muscles, the respirator must be used. It was necessary then to insert a bent iron bar across the rubber collar of the respirator in order to keep the collar below the tracheotomy tube.

DR. McLORINAN then said that the operation of tracheotomy was regarded by some people as a drastic emergency operation, performed only when the patient was in *extremis*. Dr. McLorinan wished to correct that impression if it did exist. The post-operative management of tracheotomy patients was comparatively simple. The most important points in the management were: (i) the use of chemotherapy to reduce secondary infection; (ii) the frequent sucking out of the trachea by a rubber catheter—this operation could be carried out by the nursing staff; (iii) the frequent instillation of sodium bicarbonate solution into the trachea to loosen any dried secretion in the trachea and bronchi; (iv) the use of the bronchoscope through the tracheotomy tube

to remove any dried mucus not able to be removed by suction; (v) a good nursing staff.

DR. STANLEY WILLIAMS asked what were the chief clinical guides to tracheotomy, and whether it was obstruction, cyanosis or restlessness that made Dr. McLorinan prompt to provide a better airway.

DR. ROBERT SOUTHEY congratulated Dr. McLorinan on the good result. He recalled a girl he had examined in the previous week, who had died in the ambulance on her way to Fairfield. In view of the history, it was possible that tracheotomy might have saved her life. The history in this case was that of an influenzal infection with diffuse bronchitic signs. She was at first thought to be suffering from incipient pneumonia. Suddenly signs of respiratory failure set in. She was admitted to hospital one day at 1.30 p.m. Attempts to give drinks revealed great difficulty in swallowing. At 5.30 p.m. the child became distressed and cyanosed. She was obviously making great efforts to inspire air; but there was no intercostal movement, and little diaphragmatic movement. The child appeared to be drowning in her own pharyngeal secretions. Attempts were made to suck out the excess mucus, with some success only, as the mucus rapidly reappeared. Arrangements were made for the child's transfer to Fairfield, but she succumbed on the way. Dr. Southby said that he felt quite sure, after hearing Dr. McLorinan's talk, that tracheotomy might have saved the child's life.

DR. J. W. GRIEVE thanked Dr. McLorinan for his instructive presentation. He said that the case was of particular interest in view of the mild epidemic of encephalomyelitis raging at present. In a recent copy of *The Lancet* Jennings had reported a small epidemic in Middlesex. The children had encephalitis with meningeal and cranial nerve involvement. Lumbar puncture had produced cerebro-spinal fluid containing fewer polymorphonuclear leucocytes than in Dr. McLorinan's case. Dr. Grieve wondered whether the infections were similar. Dr. McLorinan's management of his case was very informative to the society.

DR. JOHN COLQUHOUN asked Dr. McLorinan for his experiences with patients suffering from bulbar paralysis who survived respiratory failure, but were left with an associated widespread muscular weakness in the limbs, abdomen and back. Dr. Colquhoun said that he felt that the subsequent paralysis and handicap were so extreme that one wondered whether they had been saved very much.

DR. McLorinan, in reply, said that the management of these cases depended on experience, and not enough cases had been encountered to permit dogmatic utterances to be made. Restlessness was an indication for interference, especially if it was not relieved by sucking out of secretions from the posterior part of the pharynx. The patient soon became exhausted from constant aspiration, even after two or three days. In this case, tracheotomy effected so much ease to the patient as to make it completely justifiable. Dr. Southby's patient might have been saved by tracheotomy; but the child had extreme respiratory paralysis, diaphragmatic and intercostal, and would have needed respiratory treatment as well. The result would have been doubtful. With regard to Dr. Grieve's comment on the cases described in *The Lancet*, it could be said that the diagnosis of virus infection of the nervous system was very difficult. It could not be determined for certain which infections were polio-encephalitis and which were other virus diseases. Extraordinary mixtures were met with. The infections mentioned by Dr. Colquhoun were more of the ascending Landry's type, starting in the legs and working upwards, affecting all the spinal nerves without bulbar involvement. If the bulbar nerves were affected, almost all patients perished.

(To be continued.)

Correspondence.

RUPTURE OF A HYDATID CYST INTO THE VENA CAVA.

SIR: I would like to report a very interesting case of sudden death due to rupture of a hydatid of the liver into the inferior vena cava.

The following is a brief summary of the patient's history and of the post-mortem findings.

Mrs. H., aged thirty-nine years, was holidaying in Tasmania. On the morning of November 2, 1947, at approximately 8.45 a.m., she was seen by a friend with whom she

was staying. She seemed quite well, but complained of a slight pain in the right side. She asked for a cup of tea. When the hostess returned with it about fifteen minutes later she found the patient lying dead on the floor. The patient carried with her a letter from her doctor in New South Wales. This was meant to be presented to her attendant should she seek medical advice. The letter stated that she had suffered from frequent attacks of pain and dyspepsia for some years. She was thought to have suffered from chronic cholecystitis and a laparotomy had been performed a few months prior to her death. The gall-bladder was found to be normal and it was drained. Post-operatively she complained of itching and had pale stools. An X ray of her chest revealed that the right diaphragm was elevated. No definite conclusions were drawn from the findings of laparotomy or from the result of a post-operative X ray of the chest.

A post-mortem examination was performed on the order of the coroner. It was found that the liver was grossly enlarged. The whole of the right lobe was densely adherent to the diaphragm. In places it felt hard and indurated and elsewhere it felt cystic. While attempts were being made to separate the upper surface of the right lobe from the diaphragm it was noted that hydatid daughter cysts were escaping through the cut end of the inferior vena cava. The liver was then removed together with the adherent portion of the diaphragm and the inferior vena cava was opened as it coursed along the posterior surface of the right lobe. It was then noted that there was a small ragged tear in the inferior vena cava just above the entry of the hepatic veins. It was through this opening and while pressure was being exerted on the right lobe of the liver that the daughter cysts were escaping. When the right lobe of the liver was opened it was found that it was the seat of a huge hydatid cyst, there being merely a thin fibrotic shell remaining of the whole of the right lobe. This was filled with hundreds of daughter cysts and contained a large amount of hydatid fluid. The left lobe of the liver showed no abnormality. The liver weighed eight pounds.

Yours, etc.,

General Hospital,
Launceston,
Tasmania.
January 15, 1948.

W. LOWEN,
Senior Resident Medical
Officer.

Post-Graduate Work.

THE POST-GRADUATE COMMITTEE IN MEDICINE IN THE UNIVERSITY OF SYDNEY.

SEMINAR IN MEDICAL STATISTICS.

THE Post-Graduate Committee in Medicine in the University of Sydney announces that Dr. H. O. Lancaster will conduct a seminar in medical statistics on Wednesday, February 11, 1948, at 5.45 p.m., at the School of Public Health and Tropical Medicine, University Grounds. The subject of the seminar will be "Female Cancer Mortality for Australia, 1908-1945". These seminars are held on the second Wednesday of each month, and any workers in medicine or related sciences are welcome to attend.

Obituary.

JULIAN AUGUSTUS ROMAINE SMITH.

WE are indebted to Dr. J. Newman Morris for the following appreciation of the late Dr. Julian Augustus Romaine Smith.

The passing of Dr. Julian Augustus Romaine Smith on November 13, 1947, brought to a close a brilliant medical and surgical career that extended over almost half a century.

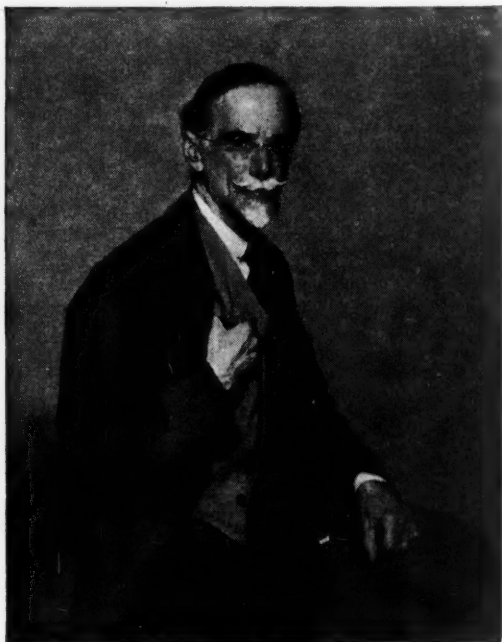
Julian Smith was born in Surrey, England, in the year 1873, and came to Australia with his parents as a lad. He was educated at Prince Alfred College in Adelaide, South Australia. From that well-known school he proceeded to the University of Adelaide, and in the year 1892, at the age of nineteen, he graduated as Bachelor of Science. After

graduation he returned to Prince Alfred College as a master in mathematics and science.

Although inducements were offered to him to embark on a career of research work in science, Smith made up his mind to adopt the profession of medicine and entered as a student in the medical school of the University of Adelaide. Certain events occurred which compelled Smith to complete his course in the medical school of the University of Melbourne. The dispersal of senior medical students from Adelaide at that period brought to Melbourne men like the late B. T. Zwar, as well as Julian Smith, while to Sydney went Charles Bickerton Blackburn.

During his student career Smith gained every exhibition in each year, finally graduating in 1898 at the head of his year M.B., Ch.B. He was senior resident medical officer at the Melbourne Hospital (now the Royal Melbourne Hospital) during 1899, and for a short time was the medical superintendent at the hospital.

In 1901 Smith proceeded to the M.D. degree of the University of Melbourne, and in 1908 to the M.S. degree of the University of Adelaide.



After completing his period of resident service in the Melbourne Hospital, he commenced general practice at Morwell, a small town in Gippsland, Victoria, some eighty miles east of Melbourne. A few years later he returned to Melbourne to enter as a junior partner the surgical practice of the late Mr. Fred Bird. In 1906 he proceeded to England where he worked for some time in the laboratories of the late Sir Almroth Wright.

In 1908 he was appointed to the honorary surgical staff at Saint Vincent's Hospital, Melbourne. On resigning his appointment in 1929 he was transferred to the consulting staff of the hospital. Julian Smith was thus one of a band of brilliant young surgeons, including Murray Morton, H. B. Devine, and T. P. Dunhill, who did so much pioneer work in the establishment of Saint Vincent's as a clinical school of the University of Melbourne. The influence of this group had a most stimulating effect on the teaching of clinical surgery.

Julian Smith joined the Victorian Branch of the British Medical Association in the year 1901 and remained a member until he retired from practice in 1936. For a short period he was a member of the Council of the Branch and held the position of assistant honorary treasurer. He took a prominent part in the scientific discussions at Branch meetings. His contributions to medical literature covered a wide field. His first published paper was printed in the *Intercolonial Medical Journal*, 1899, page 838, entitled "A Case of Laryngeal Tracheo-bronchial Diphtheria—Intravenous Injection of Diphtheria Anti-toxin, Intubation,

Tracheotomy, Recovery". His final paper was published in *THE MEDICAL JOURNAL OF AUSTRALIA*, Volume II, 1942, page 92, entitled "Transfusion by Direct Methods". Many of his papers made notable contributions to the knowledge of urological problems.

On the outbreak of war in 1939 Julian Smith returned to practice, taking over the work relinquished by his son, Colonel Julian Orm Smith, M.B.E., and he continued this wartime effort until the return of Mr. Orm Smith to practice. During that period he showed very great interest in the Blood Transfusion Service of the Australian Red Cross Society.

Julian Smith had several interesting hobbies, to all of which he devoted the same thorough attention as to his medical and surgical work. His most notable hobby was that of photography, in which he acquired world fame, and he was made an Honorary Fellow of the Royal Photographic Society.

Julian Smith was a Foundation Fellow of the Royal Australasian College of Surgeons. He had suffered from the illness which finally ended his life for some time, and during his last weeks in hospital he showed the same courageous outlook towards the inevitable end as he had exhibited during his whole career. He was by no means idle during his weeks in hospital and has left a record of some of his work which was completed within a very short time of his death.

But much of his wisdom and practical knowledge was imparted in his terse direct manner in the course of consultations and personal contact with colleagues who were always eager to discuss with him the results of his own profound powers of observation and unrivalled technical skill.

This brief account of the career of a unique personality will do little to enable those who knew him not to envisage his outstanding characteristics. Those whose good fortune it was to know him need no reminders, for he was universally regarded with admiration, esteem and affection. With all his forcefulness he was one of the kindest, most gracious and most generous of men.

Fortunately for his fellow countrymen many of his great qualities have been passed on to his three sons and his daughter. To them and to his widow the sympathy of the whole medical profession in Australia is extended.

Dr. A. E. Rowden White writes: The interruption of the Adelaide Medical School in the late nineties brought a number of brilliant senior students, among whom was Julian Smith, to the University of Melbourne to complete their studies and graduate in medicine; Julian Smith had obtained the science degree (B.Sc.) before commencing medicine, and he so impressed Professor (later Sir William) Bragg, of the Natural Philosophy School at the University of Adelaide, that he did his utmost to persuade Smith to abandon his idea of entering the medical course and become a physicist. Sir William considered Smith was the most capable student he ever had and stated that he was destined for a brilliant career with his rich theoretical and practical knowledge. His excellent technique in experiments was of such a high order that Sir William's enthusiasm was keen for Smith to work with him in the many problems he had in hand. Crystallography was one of the branches of science which had barely been touched, and Bragg was anxious that he and Smith should commence research at once. Years later Bragg's law in demonstrating the reflecting layer of crystals by varying wave-lengths of X rays, and various other high-grade research work by Bragg (father and son) made good groundwork in establishing nuclear physics. Bragg (father and son) became world-famous physicists—and Nobel Prize winners. Who knows but what Julian Smith may have been in that remarkable company of great physicists had he accepted the elder Bragg's invitation to become a scientist in the early nineties. Although Smith's loss to pure science was a real one, his brilliance enriched medicine. The examiners placed him top of his fifth year in Melbourne, and in 1899 he became senior resident medical officer to the Melbourne Hospital where he greatly impressed all the honorary physicians and surgeons. With this fine practical experience of general medicine and surgery he next brushed up his work in some of the special branches and then went to Gippsland to enter general practice at Morwell. In a little time his name and work became famous—he was visited by patients from far and wide not only for general medicine and surgery, but also for specialities such as eyes, nose and throat, ears *et cetera*. Many of his senior colleagues considered that his remarkable talents should be made available in the larger sphere of a city practice. He accepted a partnership with Mr. Fred Bird, a very popular and leading surgeon in Melbourne at the time. Before doing so he visited London where new activities of original work were attracting much interest, for example, hematology,

immunization (and especially Sir Almroth Wright's vaccine and opsonic index control), urinary tract and vesical surgery and the great value of the cystoscope, Sir Arbuthnot Lane's bold surgery of the colon and of the bony skeletal structures, *et cetera*. Mr. Fred Bird's modern private hospital, "Clareton", had a fine laboratory which Smith furnished with all kinds of scientific equipment, and every afternoon from four to six the writer for years had the privilege of working and learning Julian's fine technique in laboratory methods. His practice as a surgeon grew apace, and a couple of years before World War I the partnership with Colonel Fred Bird ended, and he bought and established himself at 59, Collins Street. Although the bulk of his work was surgical, yet he could be classed as a high-ranking physician, and many of us benefited by his discerning, well-balanced opinion in difficult and anxious cases. In fact, it did not matter in what field he explored, he excelled in it. Everyone is aware of the high pitch of perfection to which he raised amateur photography, and it is common knowledge that he was visited by professional photographers from all over Australia for advice on the complexities of illumination, poise, the build-up of subject materials *et cetera*.

Despite his very full life he showed keenness and interest in all forms of art, and artists who worked in oils or water colours were frequent visitors at his home as they were glad of his advice and criticism.

On the rare occasions he attended British Medical Association meetings he usually contributed something valuable and of interest to the discussions; but it will be remembered that after his visit to England in 1928 he created a sensation by demonstrating the famous Canty film on cancer. It aroused such enthusiasm among the clinicians, physiologists and pathologists that President J. Newman Morris granted a repeat performance a fortnight later.

Smith was a man of varied interests, and in the last few years of his life he cultivated friendships with many leading engineers who would visit his home on several nights a week. His inventive genius intrigued them and they were full of admiration for the work he turned out with his precision lathe. The medical profession will be eternally grateful to him for perfecting a machine devised by a Frenchman 100 years ago for transfusion of untreated whole blood by an arm-to-arm method. The ingenuity and simplicity of the mechanism are remarkable, and the extremely slender precision-bored needles by reducing to an absolute minimum the risk of blood clotting, enhanced the value of the whole apparatus. It was a fine contribution to the medical officers in World War II and has been of inestimable value in hospital work and private practice.

Vale, Julian Smith.

Sir Henry Newland writes: My earliest recollection of J. A. R. Smith dates from the middle nineties. It was then that the late W. H. Gosse infused new life into the Adelaide University Boat Club. Julian Smith and I were among those whose interest he inspired. There is no better way of getting to know and to esteem a man than to row with him. It was my good fortune to meet in J. A. R. Smith a coin of uncommon mintage. Julian was a man of many parts, and would have attained distinction in any walk of life. He had a superb brain, and combined with it a most exacting artistic taste. Anything he undertook he did well, which is not always a quality of those to whom execution of a task is easy. He did not flaunt his superiority, and was always ready to come to the aid of those who lacked understanding. Of his great surgical attainments I leave others to tell. His genius for portraiture in photography was combined with a generosity which furnished many of his "sitters" with a work of enduring artistry. Many will retain, too, precious memories of their visit to a haven of delight, and of him who dwelt there.

Sir Alan Newton writes: I first learnt about Julian Smith soon after I had entered the University of Melbourne as a first-year medical student. One day I and some of my fellows who shared my ambition for academic distinction looked through the honour lists of earlier years in order to find out the standard set by our predecessors. The result was dismaying, because year after year throughout his course, in first place in the first class, there was always the same name, "Julian Augustus Romaine Smith". We tried to comfort ourselves with the thought that this was an example of a remarkable bookworm, able to dazzle examiners, but deficient doubtless in those many qualities which would enable him to compete with his fellows in the race for professional eminence. We soon found that this idea was all wrong. It seemed that Julian not only had rowed in the University crew, but was also a rowing coach of some distinction, who was well able to cope with any emergency. We were told that, on one occasion when he was coaching an Ormond College crew on the lower Yarra, a mate of a tramp saw fit to call them "young university loafers".

Julian forthwith summarized the more dubious features of the mate's pedigree and habits with such force and venom that the unhappy man was left utterly confused and his seamen convulsed. It was obvious that here was no mere bookworm, but a man of parts.

In the following year I met him face to face, first as a wise and witty lecturer and next, when I was near sick unto death, as a tender, kind and able surgeon. But these conventional words do not begin to describe him as he was; never still in body or in mind; never conventional in behaviour or repressed in expression; always a little apart from the herd; always doing something unusual; in short—a genius.

He was, first of all, a great surgeon, and what is more, a great doctor. Courageous and careful, his practice embraced the whole range of general surgery, reaching a high level of technical skill in every part of this wide field. Being naturally dexterous, he found no difficulty in performing any operation with simple tools and despised all complicated instrumental aids. The operation over, he never forgot that his patient was also a human being, with the hopes and fears, anxieties and responsibilities common to all mankind. I do not suggest that he possessed what is commonly described as a good bedside manner. He would think nothing of beginning an interview by making a most caustic commentary upon his patient's taste in ties, or even upon the unusual amount of fat in his belly, but despite these eccentricities, he won the trust of his patients to such a degree that there can have been few surgeons who could claim a greater number of staunch supporters. Nor were these confined to patients, for there were many younger doctors whose hearts had been warmed by his generous praise of their work or their writings and who were devoted to him.

It is no wonder that, in association with Dunhill, Devine and Murray Morton, he built up the brilliant surgical tradition of Saint Vincent's Hospital, Melbourne. All those who worked with him there, and indeed everyone who knew him well, will never tire of recalling examples of his genius as a doctor and his idiosyncrasies as a man. "Who but Julian?" they say, "could have solved this complex surgical problem?" And they might add: "Who but Julian could have forbidden his children to eat toast at breakfast because they made such a noise munching it?" Or it might be: "Who but Julian would have fastened a small brass plate bearing the words, 'Drive slowly and beware of corners', to the dashboard of his car?"

And so we came to look upon this man as one quite apart from the common run of doctors; as one, in short, whose genius made him perhaps the most prized figure in the history of our medical school. Nor did we confine our admiration to his genius. We admired, in addition, his thoroughness, his unselfishness and, perhaps more than anything else, his self-sacrifice in resuming the burden of surgical work when his sons sailed overseas with the Australian Army Medical Corps soon after the outbreak of war.

Julian enjoyed a long life and remained young in mind until its end. Who but Julian, after retiring from surgical work, could have become one of the foremost photographers in the world? Who but Julian could have attacked and solved the technical problem of transfusion of whole blood with such zest and brilliance when nearing the age of seventy? Who but Julian could have accomplished even a small fraction of his remarkable feats? And what can we, his friends, do but thank God for having known him?

Sir Hugh Devine writes: As we grieve for Julian Smith, there comes into our minds the thought, "he shall not wholly die", for there is so much of him that will live on in the lives of those who had the good fortune to come under his influence.

Julian Smith's approach to medicine was so scientific, so utterly truthful, that it was an education to be associated with him professionally. His attitude towards life was so original, his personality so brilliant and his friendship so warm-hearted that it was a joy and a privilege to be his friend and colleague. To medical students he was an inspiration. His methods of clinical teaching were realistic and forceful; and he had a way of his own of making students exercise their reasoning power. His clinics were always an attraction and he played a distinguished part in moulding Saint Vincent's Hospital into a clinical school. He was the ideal consultant: the wise surgeon. There were few problems in surgery that did not look simple after he had applied his virile mind to them, and his natural kindness in the handling of the human side of these problems earned the affection of the doctor and the gratitude of the patient.

Julian Smith had deeply impressed the world of photographic art, and when one travelled abroad one was fre-

quently and eagerly asked about him. Genius was the word you frequently heard when this work was mentioned, just as here in his own country genius is the word you often hear coming from the lips of those who speak of his surgical work.

Dr. D. Murray Morton writes: My association and friendship with Julian Smith began when he was appointed to the staff of Saint Vincent's Hospital in 1908. At that time we who were preoccupied with the building up of the newly recognized clinical school at the hospital were gratified beyond measure by the acquisition of a man of Julian Smith's calibre as a member of the staff. Over the years his ability as a surgeon and a teacher gave solid support to the building up of the reputation of the hospital as a clinical school and as a centre of surgery.

His vivid and forceful personality will be missed sadly. I always admired his gift of clear and terse expression in pure Anglo-Saxon terms. No contemporary contributed so much to our information, and frequently to our entertainment, as did Julian.

He was a very good friend to myself. Twenty years ago when my life was despaired of in a grave illness, Julian was one of several friends and colleagues who gave their services as consultants, and at a critical stage the sage advice of Julian, I am convinced, enabled me after this long interval to have the melancholy opportunity of contributing to this obituary.

Dr. H. Douglas Stephens writes: The death of Dr. Julian Smith removes from our midst one of the most distinguished graduates the University of Melbourne has ever produced. He was primarily a science graduate in Adelaide, South Australia, and had he followed the advice of Professor Bragge would undoubtedly have become preeminent in that sphere. He decided, however, to deflect his talents to the study of medicine. The early years of the course were passed in South Australia, but he finished the latter years in the Melbourne Medical School carrying all before him.

He was senior resident medical officer at the Melbourne Hospital in 1899, and here I first made his acquaintance, leading to a close friendship throughout his lifetime. His main object always appeared to be the study of fundamentals, to get to the root of the matter. It was this characteristic of thoroughness which made him command so much respect from patients, colleagues and students alike. His insatiable curiosity and intelligent appreciation of his cases were only equalled by his manual dexterity as his work as senior surgeon to Saint Vincent's Hospital subsequently proved. His knowledge of medicine was on as high a plane as his surgical work, and he was consequently much sought after as a consulting physician. A short period of medical practice in the country, soon after qualifying, proved of inestimable benefit to him in his later life. It enabled him to devote time to haematological and biological problems in which he took a particular interest. He carried out much experimental work with various poisons as causes of hay fever from which he himself suffered. The country life induced a scientific inquiry into breeding experiments in birds and animals. It also made him an expert in the mechanics of the Wimshurst machine preceding the earliest developments of X-ray technique. All these interests were reflected in his subsequent life as a specialist in medicine and surgery in Melbourne. Any spare time he devoted most assiduously to various hobbies, all of which he pursued relentlessly.

He bred Carneau pigeons for several years, securing pure white strains, and obtained prizes wherever exhibited in Australia and America. His well-known Rolls Royce single-seater motor-car was always mechanically and most efficiently maintained by himself and lasted him throughout his lifetime.

Although heavily occupied with his professional work of a most exacting nature, he found time to develop an absorbing interest in photography, a hobby he had always enjoyed. He now, however, turned his scientific skill to photography on a scale unequalled by the best professionals in this work. Rapidly, but nevertheless laboriously, working into the early morning hours, he turned out work which commanded the attention of the photographic world. He achieved the reputation of being the only exhibitor who has in company with the late Alfred Keighley had his pictures accepted on two occasions for the Tyng Collection. Experts say his work is so characteristic and so meritorious that it would be recognized even if unsigned.

The onset of World War II diverted his energies to an entirely different type of scientific activity. He had long been interested in haematology and blood transfusion, but now became absolutely obsessed with the need for a better method of transfusing whole blood direct from the donor to the patient. Forty years previously he had experimented with the primitive method of Crile, using paraffinized rubber

tubes. To accomplish this objective he realized that a knowledge of metal and lathe work was essential. Although he had never even used a lathe in his life, it was most remarkable to note the astounding progress he made on his own initiative in a few months. He finally turned out a direct transfusion set mathematically correct in every detail and supplied many of these to various army and civil hospitals throughout Australia and to others in England, including a set to Sir Howard Florey at Oxford. The transfusion needles were models of perfection, perfectly calibrated and polished inside even to as small a diameter as one millimetre. His apparatus for sharpening hypodermic and blood transfusion needles was another example of scientific precision.

By his death we have lost a genius.

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- "Reflections on Bacilluria", *Australian Medical Journal*, 1913, page 1187.
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- Discussion at the Australasian Medical Congress in Melbourne in 1923 on papers on renal insufficiency, prostatectomy and exophthalmic goitre, *THE MEDICAL JOURNAL OF AUSTRALIA*, Volume II, 1923, pages 597, 603 and 607.
- Report of case shown at Branch meeting on October 3, 1923, bilateral hydronephrosis, *THE MEDICAL JOURNAL OF AUSTRALIA*, Volume I, 1924, page 24.
- Discussion at Branch meeting on paper on cholecystitis and its complications read by Alan Newton, *THE MEDICAL JOURNAL OF AUSTRALIA*, Volume I, 1927, page 98.
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- "Toxic Goitre", *THE MEDICAL JOURNAL OF AUSTRALIA*, Volume I, 1932, page 877.
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Australian Medical Board Proceedings.

TASMANIA.

THE undermentioned have been registered, pursuant to the provisions of the Medical Act, 1918, of Tasmania, as duly qualified medical practitioners:

Marden, Leslie Glendower, M.B., B.S., 1947 (Univ. Melbourne), Ulverstone, Tasmania.

Young, Mary, M.R.C.S. (England), L.R.C.P. (London), 1941, M.B., B.S., 1942 (London), St. Helens, Tasmania.
 Ross-Smith, Charles James, M.B., B.S., 1946 (Univ. Sydney), Sorell, Tasmania.
 Young, Aretas William Overton, M.R.C.S. (England), L.R.C.P. (London), 1942, M.B., B.S., 1943 (London), Royal Hobart Hospital, Hobart.
 Holden, Isobel Mary, M.B., B.S., 1946 (Univ. Melbourne), Royal Hobart Hospital, Hobart.
 Willes, Helen Booth, M.B., B.S., 1946 (Univ. Sydney), Royal Hobart Hospital, Hobart.
 Wiener, Saul, M.B., B.S., 1947 (Univ. Melbourne), Royal Hobart Hospital, Hobart.

The following additional qualifications have been registered:

Millar, John Patrick, M.R.A.C.P., 1947.
 Millar, Archibald McLaren, F.R.C.S. (Edinburgh), 1946.

Nominations and Elections.

THE undermentioned have applied for election as members of the New South Wales Branch of the British Medical Association:

Brown, Alan Belfield, provisional registration, 1947 (Univ. Sydney), Parkes District Hospital, Parkes.
 Blackman, John Edward, M.B., B.S., 1946 (Univ. Sydney), Sydney Hospital, Macquarie Street, Sydney.

THE undermentioned has applied for election as a member of the Tasmanian Branch of the British Medical Association:

Hudson, Rodney James, M.B., B.S., 1940 (Univ. Sydney), 71, Main Road, Moonah.

THE undermentioned has applied for election as a member of the South Australian Branch of the British Medical Association:

Barter, Robert Alexander, M.B., B.S., 1947 (Univ. Adelaide), Royal Adelaide Hospital, Adelaide.

THE undermentioned have been elected as members of the South Australian Branch of the British Medical Association:

Cullity, Thomas Brendow, M.B., B.S., 1947 (Univ. Adelaide), Bedford Park Sanatorium, Adelaide.
 Phillips, Alan Dustan, M.B., B.S., 1947 (Univ. Adelaide), Box 34, Berri, South Australia.

Medical Appointments.

THE undermentioned have been appointed honorary clinical assistants at the Royal Adelaide Hospital, Adelaide: Medical Section, Dr. R. N. C. Bickford, Dr. H. J. Edelman, Dr. M. W. Miller, Dr. J. M. McPhie, Dr. R. A. A. Pellew, Dr. C. T. Piper, Dr. J. W. Sangster and Dr. R. F. West; Surgical Section, Dr. A. G. Campbell, Dr. D. C. Dawkins, Dr. G. M. Hone, Dr. B. G. Johnston, Dr. T. D. Kelly, Dr. L. J. T. Pellew, Dr. J. L. S. Scott, Dr. M. Y. Sheppard, Dr. G. H. Solomon, Dr. G. M. Turnbull and Dr. G. W. Verco; Allergy Clinic, Dr. J. E. Bateman; Ophthalmological Section, Dr. D. O. Crompton, Dr. T. L. McLarty, Dr. S. Pearlman and Dr. Alfreda Wilma Thrush; Dermatological Section, Dr. A. J. Hakendorf, Dr. C. H. Schafer and Dr. F. G. T. Turner; Radiotherapy Section, Dr. R. de G. Burnard and Dr. B. C. Smeaton; Radiological Section, Dr. R. de G. Burnard, Dr. J. B. Thiersch and Dr. P. W. Verco; Gynecological Section, Dr. A. D. Byrne, Dr. H. E. Pellew, Dr. R. L. Verco and Dr. Freida Ruth Heighway; Sterility Clinic (Male Section), Dr. R. A. Isenstein; Sterility Clinic (Female Section), Dr. H. E. Pellew; Orthopaedic Department, Dr. N. P. Wilson.

Dr. J. R. S. G. Beard has been appointed honorary consulting surgeon at the Royal Adelaide Hospital, Adelaide.

Dr. C. H. Wood has been appointed government medical officer at Kingaroy, Queensland.

Books Received.

"The Treatment of Rheumatism in General Practice", by W. S. C. Copeman, O.B.E., M.A., M.D. (Cantab.), F.R.C.P. (London); Fourth Edition; 1946. London: Edward Arnold and Company. 8½" x 5½", pp. 272. Price: 12s. 6d.

"Wayfarers in Medicine", by William Doolin; 1947. London: William Heinemann (Medical Books), Limited. 8½" x 5½", pp. 294, with many illustrations. Price: 21s.

"The Personality of the Preschool Child: The Child's Search for His Self", by Werner Wolff; 1947. London: William Heinemann (Medical Books), Limited. 9" x 6", pp. 358, with illustrations. Price: 25s.

"The Child's Lung: Developmental Anatomy, Physiology and Pathology", by Stefan Engel, M.D.; 1947. London: Edward Arnold and Company. 8½" x 5½", pp. 340, with many illustrations. Price: 40s.

Diary for the Month.

FEB. 3.—New South Wales Branch, B.M.A.: Organization and Science Committee (with representatives of Special Groups).

FEB. 4.—Victorian Branch, B.M.A.: Branch Meeting.

FEB. 4.—Western Australian Branch, B.M.A.: Council Meeting.

FEB. 6.—Queensland Branch, B.M.A.: Branch Meeting.

FEB. 10.—New South Wales Branch, B.M.A.: Executive and Finance Committee.

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New South Wales Branch (Honorary Secretary, 135, Macquarie Street, Sydney): Australian Natives' Association; Ashfield and District United Friendly Societies' Dispensary; Balmmain United Friendly Societies' Dispensary; Leichhardt and Petersham United Friendly Societies' Dispensary; Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney; North Sydney Friendly Societies' Dispensary Limited; People's Prudential Assurance Company Limited; Phoenix Mutual Provident Society.

Victorian Branch (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federated Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

Queensland Branch (Honorary Secretary, B.M.A. House, 225, Wickham Terrace, Brisbane, B.17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute; Brisbane City Council (Medical Officer of Health). Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 178, North Terrace, Adelaide): All Lodge appointments in South Australia; all Contract Practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205, Saint George's Terrace, Perth): Wiluna Hospital; all Contract Practice appointments in Western Australia. All government appointments with the exception of those of the Department of Public Health.

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